CHARLES

VOL. I pp. 1 to 656a.

TRANSCRIPT OF RECORD

IN THE

Supreme Court of the United States

OCTOBER TERM, A. D. 1942.

No. 994-9[illegible]

THE MERCOID CORPORATION,

Petitioner,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SEVENTH CIRCUIT.

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IN THE

UNITED STATES CIRCUIT COURT OF APPEALS

FOR THE SEVENTH CIRCUIT.

No. 8019.

THE MERCOID CORPORATION,
Plaintiff-Appellee,

vs.

MINNEAPOLIS HONEYWELL REGULATOR COMPANY,
Defendant-Appellant.

No. 8020.

THE MERCOID CORPORATION,
Plaintiff-Appellant,

vs.

MINNEAPOLIS HONEYWELL REGULATOR COMPANY,
Defendant-Appellee.

Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division.

TRANSCRIPT OF RECORD FILED MAY 23, 1942.
PRINTED RECORD.

U.S.C.A. 7
FILED
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1,734,015—I. E. McCabe, October 29, 1929 1147
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1 Pleas in the District Court of the United States for the Northern District of Illinois, Eastern Division, begun and held at the United States Court Room, in the City of Chicago, in said District and Division, before the Honorable John P. Barnes, District Judge of the United States for the Northern District of Illinois on 24th day of March, in the year of our Lord one thousand nine hundred and forty-two, being one of the days of the regular March Term of said Court, begun Monday, the 2nd day of March, and of our Independence the 166th year. Placita

Present:

Honorable John P. Barnes, District Judge.
William H. McDonnell, U. S. Marshal.
Hoyt King, Clerk.

2 IN THE DISTRICT COURT OF THE UNITED STATES,
Northern District of Illinois,
Eastern Division.

The Mercoid Corporation,
Complainant,
vs.
Minneapolis-Honeywell Regulator Co.,
Defendant.
} No. 1839.

Be It Remembered, that the above-entitled action was commenced by the filing of the following Complaint in the above-entitled cause, in the office of the Clerk of the District Court of the United States for the Northern District of Illinois, Eastern Division, on this the 29th day of June, A. D. 1940.

3 IN THE DISTRICT COURT OF THE UNITED STATES,
For the Northern District of Illinois,
Eastern Division.

The Mercoid Corporation,
Complainant,
vs.
Minneapolis-Honeywell Regulator Co.,
Defendant.
} Civil Action No. 1839.
Equitable Relief Sought.

COMPLAINT FOR DECLARATORY DECREE.

To the Honorable, the Judges of the United States District Court in and for the Northern District of Illinois, Eastern Division:

Complainant, praying for the declaration sought herein, respectfully represents:

1. Complainant, The Mercoid Corporation, is a corporation of Delaware, having a principal place of business and factory at 4201 Belmont Avenue, Chicago, Illinois.

2. Defendant, Minneapolis-Honeywell Regulator Co. is a corporation of Delaware, licensed to do business within

the State of Illinois at 208 South LaSalle Street, Chicago, Illinois, and having a Registered Agent, The Corporation Trust Company of 208 South LaSalle Street, Chicago, Illinois.

4 3. Complainant and defendant are separately engaged in the manufacture and sale of electrical devices, a large portion of which devices are adapted to control the operation of heating apparatus, in the sale of which complainant and defendant appeal to the same customers.

4. An actual controversy exists between complainant and defendant, in that defendant has notified complainant verbally and in writing that the devices furnished by Mercoid to the trade for controlling the operation of a furnace infringes the defendant's patent No. 1,813,732, granted on July 7, 1931, to Edward E. Freeman (a copy of which patent is attached hereto as complainant's Exhibit A and made a part hereof), and owned by the defendant, which charge of infringement was embodied in a letter from the defendant to the complainant wherein it was stated,

"I was to advise you of certain patents owned or controlled by our Company which are being infringed by some of the devices that we understand you are building. . . . In reference to your furnace fan circuits, we would call your attention to Freeman patent No. 1,813,732:",

(a copy of which letter is attached hereto as complainant's Exhibit B and made a part hereof), and further, conferences have been held between officers of the complainant corporation and representatives and officers of the defendant corporation, as shown by the letter from the defendant to the complainant, dated January 24, 1940, (a copy

5 of which is attached hereto as complainant's Exhibit C and made a part hereof). During one of these conferences, defendant submitted a proposed license agreement in typewritten form which it delivered to Mr. Hugh Courteol, President of The Mercoid Corporation, on or about the first part of the year 1940, (a copy of which license agreement with price schedule attached is attached hereto as complainant's Exhibit D and made a part hereof). Defendant, on June 21, 1940, notified complainant,

"The question of your company taking a license under the Freeman patent has been dragging along. . . . In view of your failure to reach a decision on the matter we have no choice but to enter suit, and this we expect to do on July 1.",

(a copy of which letter is attached hereto as complainant's Exhibit E and made a part hereof). Furthermore, the complainant notified the defendant in writing on June 28, 1940, that the complainant denies the validity of the Freeman patent and denies that the complainant is infringing or contributing to the infringement of the Freeman patent, (a copy of which letter is attached hereto as complainant's Exhibit F and made a part hereof).

5. The jurisdiction of this United States District Court arises from the fact that an actual controversy which exists between complainant and defendant arises under the Patent Laws of the United States and is a question of whether
6 or not the devices made and sold and offered for sale by complainant for controlling the operation of a furnace infringe or contribute to the infringement of the Freeman patent No. 1,813,732, and whether or not said Letters Patent are good and valid in law, questions which have been committed to the exclusive jurisdiction of United States Courts.

6. The devices charged to infringe the said Freeman patent, as furnished by the complainant to the trade, include patented fan and limit controls for furnaces covered by the McCabe patent No. 1,834,288, December 1, 1931, (a copy of which is attached hereto, complainant's Exhibit G and made a part hereof) and are furnished to the trade under a license from McCabe. The Mercoid Fan Control and the Mercoid Limit Control are tradenames applied by The Mercoid Corporation to the same instrument constructed in accordance with the said McCabe patent, complainant's Exhibit G, which become "Mercoid Fan Controls" with one setting and "Mercoid Limit Controls" with another setting. The Mercoid "Combination Fan and Limit Control" combines the two settings in the same single instrument. The Mercoid Corporation has sold both the "Mercoid Fan Control" instrument and the "Mercoid Limit Control" instrument for use separately and in conjunction with each other in heating systems which do not employ the elements specified in the Freeman patent No. 1,813,732. These controls are sold by the complainant to manufacturers and dealers of coal stokers, oil burners,
7 gas burners, and other heating apparatus. Some of these manufacturers sell these Mercoid devices to dealers. The dealers sell the complete heating system to the user and the dealer makes the installation on the prem-

ises of the user. The Mercoid Corporation does not sell nor install complete installations in which its patented devices form a part.

7. The defendant, within the past year, revived the charge of infringement of the Freeman patent No. 1,813,732 by calls of its officers or representatives upon the complainant (as shown by the attached correspondence, complainant's Exhibits C and E) in an endeavor to induce the complainant to accept a license, complainant's Exhibit D, under said Freeman patent. Under the terms of said license, should the complainant accept said license, the complainant would be compelled to pay a royalty upon every device it made under the said McCabe patent whether or not it was to be installed in a heating system such as disclosed in said Freeman patent.

8. Said Letters Patent No. 1,813,732 and the claims thereof alleged to be infringed by the use of complainant's said device are void because the said Edward E. Freeman is not the original, first and sole inventor thereof and because, in view of the state of the art at the time of the patentee's alleged invention, and long prior thereto, the alleged invention claimed in said patent did not involve invention, but involved nothing more than the exercise of mechanical skill.

9. The said patent No. 1,813,732 and the claims thereof are void because the alleged invention claimed in said Freeman patent was, long prior to the patentee's alleged
8 invention thereof, and more than two years before the filing of the application for Letters Patent thereof, described and patented in the following United States Letters Patent:

Number	Date	Inventor
300,223	March 29, 1887	E. H. Johnson
479,761	July 26, 1892	W. H. Kilbourn
644,106	February 27, 1900	I. D. Smead
917,483	April 6, 1909	C. C. Peck
926,332	June 29, 1909	T. E. Hurt
1,138,854	May 11, 1915	E. F. Edgecombe, Jr.
1,193,271	August 1, 1916	F. A. Kuntz
Re.15,531	January 23, 1923	E. F. Edgecombe, Jr.
1,602,363	October 5, 1926	J. C. Johnson
1,758,146	May 13, 1930	Walter M. Cross

10. Edward E. Freeman was not the original and first inventor or discoverer of any material or substantial part of the furnace control covered by said Letters Patent No. 1,813,732, but the same, and all material and substantial parts thereof, were previously made and known and had been in public use, for more than two years before the filing of the application for said Letters Patent, in St. Louis, Missouri, by Frank Fillo and in Wheaton, Illinois, by J. A. Portner.

11. The defendant's insistence that complainant take a license (complainant's Exhibit D), under the said Freeman patent, is an attempt to extend its patent monopoly beyond the boundaries described in the claims of the patent to cover the sale by the complainant of an article not patented by the defendant. Complainant believes and avers that licenses similar to that submitted to the complainant (complainant's Exhibit D) have been entered into between the defendant and others, as referred to in defendant's letter, dated June 21, 1940, (complainant's Exhibit E).

12. Complainant is in fear and danger defendant will notify customers and prospective customers of The Mercoid Corporation of its allegations that complainant's said devices infringe said Freeman patent, or threaten them with suit under said Freeman patent, causing complainant irreparable injury.

13. Defendant, well knowing that the claims of said Freeman patent No. 1,813,732 are not valid claims or are so restricted as not to be infringed by complainant's said devices, is not acting in good faith in persisting in such allegations and in harassing the complainant, and in provoking this controversy.

Wherefore, complainant prays:

(a) That this Honorable Court issue a writ of subpoena ad respondendum under the seal of this Court directed to the defendant, requiring it to appear and make answer to this complaint and to perform and abide by such further orders and decrees as this Court may make;

(b) That this Honorable Court declare the rights of complainant and defendant and their respective legal relations in connection with the matter of the controversy as herein set forth;

(c) That this Honorable Court may enter a declaratory decree adjudging that the defendant is not entitled to ex-

tend its patent monopoly beyond the boundaries described in the claims of the Freeman patent No. 1,813,732 to include the complainant's said fan and limit controls not patented by the defendant;

(d) That this Honorable Court may enter a declaratory decree adjudging that the complainant's said fan and limit controls, as specified herein, do not infringe nor contribute to the infringement of the defendant's patent No. 1,813,732;

(e) That this Honorable Court may enter a declaratory decree that defendant's patent No. 1,813,732 is invalid;

(f) That this Honorable Court may enter a declaratory decree adjudging the complainant has the right to manufacture and sell its said fan and limit controls, as specified herein, without molestation by the defendant;

(g) That defendant, its officers, agents, employees, 11 associates, and confederates be temporarily restrained and enjoined, pending the final determination of this complaint, from bringing suit for infringement of said Freeman patent against the complainant, or against the complainant's customers or prospective customers, or directly or indirectly threatening complainant's customers or prospective customers with suit for infringement of the said Freeman patent, or from, in any manner, interfering with complainant's business;

(h) And such other and further relief as to this Honorable Court may seem meet and proper in the premises; that the defendant may be decreed to pay the costs of this proceedings.

The Mercoid Corporation,
By Hugh Courteol,
President.

Langdon Moore,
Solicitor and Attorney for Plaintiff
53 West Jackson Boulevard
Chicago, Illinois

12 And on, to wit, the 19th day of July, A. D. 1940, came the defendant by its attorneys and filed in the Clerk's office of said Court its certain Answer in words and figures following, to wit:

13 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

ANSWER.

iled
y 19,
940

The defendant, Minneapolis-Honeywell Regulator Company for answer to the Complaint filed in the above-entitled cause says:

1. The defendant admits the allegations contained in Paragraph 1 of the Complaint.

2. The defendant admits the allegations contained in Paragraph 2 of the Complaint insofar as it relates to the defendant being a corporation of Delaware and being licensed to do business in the State of Illinois, but asserts that the defendant's complete name is Minneapolis-Honeywell Regulator Company.

3. The defendant admits the allegations contained in Paragraph 3 of the Complaint.

14 4. The defendant admits the allegations contained in Paragraph 4 of the Complaint.

5. The defendant admits the allegations contained in Paragraph 5 of the Complaint.

6. The defendant alleges that it is without knowledge or information sufficient to form a belief as to the truth of the allegations contained in Paragraph 6 of the Complaint, that fan and limit controls for furnaces as furnished by the plaintiff are covered by the McCabe patent No. 1,834,288 dated December 1, 1931 and are furnished by the plaintiff to the trade under a license from McCabe and therefore denies the same and demands strict proof thereof on the part of the plaintiff.

The defendant alleges that it is without knowledge or information sufficient to form a belief as to the truth of the allegations contained in Paragraph 6 of the Complaint, that the Mercoid Fan Control and the Mercoid Limit Control are trade names and that said controls are constructed in accordance with McCabe patent No. 1,834,288 and therefore denies the same and demands strict proof thereof on the part of the plaintiff; and defendant asserts that said

allegations are immaterial to the issue here involved, and alleges that said Mercoid Fan Control and Mercoid Limit Control are different instruments and have different settings operating in a different manner, for a different purpose and function differently.

The defendant admits that the Mercoid "Combination Fan and Limit Control" is an instrument that combines two settings but asserts that the instrument is so constructed and the settings so arranged by the plaintiff as to carry out the teachings and invention of the Freeman patent No. 1,813,732 and is the device charged to infringe said Freeman patent.

15 The defendant alleges that it is without knowledge or information sufficient to form a belief as to the truth of the allegations contained in Paragraph 6 of the Complaint, that The Mercoid Corporation has sold Mercoid Fan Control instruments and Mercoid Limit Control instruments for use separately and in conjunction with each other in heating systems which do not employ the elements specified in the Freeman patent and therefore denies the same and leaves plaintiff to make its own proofs; and defendant asserts that said allegations are immaterial to the issue here involved.

The defendant admits the allegation contained in Paragraph 6 of the Complaint as to the sale of plaintiff's controls to manufacturers and dealers of heating apparatus.

The defendant admits the allegation contained in Paragraph 6 of the Complaint that dealers make installations of complete heating systems on the premises of the user; and defendant asserts that the dealers, in making installations on the premises of the user, employ and use plaintiff's Combination Fan and Limit Control and that said Combination Fan and Limit Controls are installed by said dealers in accordance with written installation instructions prepared and distributed by the plaintiff as taught by the invention and teachings of said Freeman patent.

The defendant alleges that it is without knowledge or information sufficient to form a belief as to the truth of the allegation of Paragraph 6 that the plaintiff does not sell nor install complete installations in which its patented devices form a part and therefore denies the same and demands strict proof thereof; and defendant asserts that infringing devices have been used by the plaintiff in

16 complete installations; and that said Combination Fan and Limit Controls are made and have been used by the plaintiff in its factory at 4201 Belmont Avenue, Chi-

cago, Illinois in complete installations in accordance with the invention and teachings of said Freeman patent.

7. The defendant admits the allegations contained in Paragraph 7 of the Complaint as to Exhibits C and E, but denies that under the terms of defendant's license, the plaintiff would be compelled to pay a royalty upon every device it made under the said McCabe patent whether or not it was installed in a heating system such as disclosed in said Freeman patent; and defendant alleges that any offer of a license to the plaintiff herein and the payment therefor was limited to the payment of royalties upon devices made, sold and installed in accordance with the invention and teachings of the said Freeman patent and coming within the scope of the claims defining said invention and teachings.

8. The defendant denies the allegation contained in Paragraph 8 of the Complaint that the claims of the Freeman patent are void and that said Edward E. Freeman was not the original, first and sole inventor thereof, but asserts that said Edward E. Freeman was the original, first and sole inventor of the claims of said patent No. 1,813,732 and that the claims thereof are good and valid.

Defendant further asserts that the claims of said Letters Patent No. 1,813,732 did involve invention and denies the allegation that the invention claimed in said patent No. 1,813,732 involved nothing more than the exercise of mechanical skill.

17 9. The defendant denies that said patent No. 1,813,732 and the claims thereof are void because of the subject-matter described and patented in the patents referred to in Paragraph 9 of the Complaint and alleges that said patent No. 1,813,732 and the claims thereof are good and valid.

10. The defendant denies the allegations contained in Paragraph 10 and asserts that the subject-matter of the said Freeman patent No. 1,813,732 was not known and not in public use for more than two years before the filing date of the application for said Letters Patent in St. Louis, Missouri, by Frank Fillo and in Wheaton, Illinois, by J. A. Portner, or by anyone else.

11. The defendant denies the allegation contained in Paragraph 11 of the Complaint that it has attempted to extend its patent monopoly beyond the boundaries described in the claims of its said patent.

Further answering Paragraph 11 of the Complaint, defendant admits that it has granted licenses to others and

alleges that its licensees have acknowledged and acquiesced in said Freeman patent No. 1,813,732; and that the names and addresses of its present licensees are as follows:

Perfex Corporation, Milwaukee, Wisconsin,
Penn Electric Switch Co., Goshen, Indiana,
White Rodgers Electric Company, St. Louis, Missouri,
Cook Electric Company, Chicago, Illinois,
Bendix Aviation Corporation, (Friez Division), South Bend, Indiana.

18 12. The defendant denies the allegations of Paragraph 12 and alleges that it has not heretofore notified customers of plaintiff, nor threatened so to do, but defendant alleges that it did notify plaintiff, The Mercoid Corporation, in accordance with the letter, "Exhibit E," and did file suit against plaintiff as stated it would do in its letter, "Exhibit E," on July 1, 1940 in the United States District Court for the Northern District of Illinois, Eastern Division, for infringement of said Freeman patent No. 1,813,732, which case is entitled, Minneapolis-Honeywell Regulator Company v. The Mercoid Corporation, Civil Action No. 1842.

13. The defendant denies the allegation contained in Paragraph 13 of the Complaint that it is not acting in good faith and persisting in harassing the plaintiff, and further denies the allegation that the claims of said Freeman patent No. 1,813,732 are not valid claims, or that they are restricted as not to be infringed by plaintiff's said devices; and alleges that defendant has at all times acted in good faith with regard to its said Freeman patent No. 1,813,732.

19 Whereas, defendant prays that this cause be dismissed.

Minneapolis-Honeywell Regulator Company,
By Bair & Freeman, Its Attorneys.

Bair & Freeman,
Attorneys for Defendant,
Suite 1400, 135 South LaSalle St.,
Chicago, Illinois
Randolph 5777

W. P. Bair
Will Freeman
Of Counsel for Defendant

Received a copy of the foregoing Answer this 19th day of July, 1940.

Langdon Moore
Attorneys for Plaintiff

20 And on, to wit, the 12th day of August, A. D. 1940,
12, came the Complainant by its attorneys and filed in the Clerk's office of said Court its certain Interrogatories in words and figures following, to wit:

21 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * * *

INTERROGATORIES PROPOUNDED BY COMPLAINANT UNDER RULE 33—RULES OF CIVIL PROCEDURE.

Now comes the complainant in the above entitled cause, by its solicitor, and propounds the following interrogatories tc the defendant under the provision of Rule 33, Rules of Civil Procedure, said defendant, Minneapolis-Honeywell Regulator Company, being a private corporation, said interrogatories herein are to be answered under oath by an officer of the defendant corporation:

1. State whether or not the defendant installs on the premises of the user heating systems as defined by the claims of the Freeman patent No. 1,813,732, July 31, 1931.

2. If the answer to Interrogatory No. 1 is in the affirmative, state whether or not the defendant manufactures the controls necessary to said heating system.

3. If the answer to Interrogatory No. 1 is in the negative, state whether or not the defendant manufactures and sells to manufacturers of heating systems or to dealers the controls necessary to install heating systems as defined by the claims of the said Freeman patent.

22 4. If the answers to Interrogatories Nos. 1, 2 or 3 is in the affirmative, state whether or not the defendant publishes for distribution to the trade advertising matter in the form of catalogues or the like describing or illustrating the controls and the manner in which said controls are to be connected, as by wiring diagrams, to install heating systems as defined by the claims of said Freeman patent.

5. If the answer to Interrogatory No. 4 is in the affirmative, state whether or not defendant can and will furnish the complainant with copies of such advertising matter, including wiring diagrams, and attach such copies to its answer to these interrogatories.

6. State whether or not a license identical in terms with the license submitted to the complainant, "Complainant's Exhibit D," was accepted by each and every one of the defendant's licensees as specified in paragraph 11 of the defendant's answer to the bill of complaint.

7. If the answer to Interrogatory No. 6 is in the negative, state in what respect each license to each of said licensees differs in terms from the license submitted to the complainant, "Complainant's Exhibit D."

8. State whether or not each of said licensees set up in defendant's answer installs on the premises of the user heating systems as defined by the claims of said Freeman patent.

9. If the answer to Interrogatory No. 8 is in the affirmative, state whether or not each of said licensees manufactures the controls necessary to said heating system.

23 10. If the answer to Interrogatory No. 9 is in the negative, specify which licensees manufacture said controls and which licensees purchase said controls from control manufacturers.

11. State whether or not each of said licensees listed by name and address in paragraph 11 of defendant's answer to the bill of complaint, or any of them, publish for distribution to the trade advertising matter in the form of catalogues or the like describing or illustrating the controls and the manner in which said controls are connected, as by wiring diagrams, to install heating systems as defined by the claims of said Freeman patent.

12. If the answer to Interrogatory No. 11 is in the affirmative, state whether or not the defendant can and will furnish the complainant with copies of such advertising, including wiring diagrams, as may be published by each of said licensees and attach such copies to its answer to these interrogatories.

The Mercoid Corporation,
Complainant,
By Langdon Moore,
Attorney for Complainant,
53 West Jackson Boulevard
Chicago, Illinois.

Filed gust 20, 1940

24 And on, to wit, the 20th day of August, A. D. 1940, came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Interrogatories in words and figures following, to wit:

25 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

INTERROGATORIES PROPOUNDED BY DEFENDANT UNDER RULE 33—RULES OF CIVIL PROCEDURE.

Now comes the defendant in the above entitled cause, by its solicitors, and propounds the following interrogatories to the plaintiff under the provision of Rule 33, Rules of Civil Procedure, said plaintiff, The Mercoid Corporation, being a private corporation, said interrogatories herein are to be answered under oath by an officer of the plaintiff corporation:

1. State when plaintiff, The Mercoid Corporation, first began the manufacture and sale of the "Mercoid Combination Fan and Limit Control" referred to in Paragraph 6 of the Complaint.

2. State whether or not plaintiff publishes for distribution to the trade advertising matter in the form of catalogs or the like describing or illustrating the manner in which its said "Mercoid Combination Fan and Limit Con-
26 trol" is to be installed in a heating system.

3. If the answer to interrogatory 2 is in the affirmative, state whether or not plaintiff can and will furnish the defendant with copies of such advertising matter, and attach such copies to its answer to these interrogatories.

4. State whether or not plaintiff publishes and distributes, or has published and distributed within six years last past, wiring diagrams for use by the trade in installing said "Mercoid Combination Fan and Limit Control."

5. If the answer to interrogatory 4 is in the affirmative, state whether or not plaintiff can and will furnish the defendant with copies of such wiring diagrams and attach such copies to its answer to these interrogatories.

6. If plaintiff furnishes defendant copies of wiring diagrams in answer to interrogatory 5, then state when such wiring diagrams were first published and distributed.

7. State when plaintiff first published and distributed to the trade wiring diagrams of any kind for said "Mercoid Combination Fan and Limit Control."

8. State whether or not the "Mercoid Combination Fan and Limit Control" referred to in Paragraph 6 of the Complaint is intended for the control of a heating system.

9. State whether or not the "Mercoid Combination Fan and Limit Control" manufactured by plaintiff is, when
27 sold by plaintiff, installed in accordance with plaintiff's wiring diagrams for the purpose of said "Mercoid Combination Fan and Limit Control" controlling the operation of a heating system.

10. State whether or not plaintiff has distributed advertising matter or wiring diagrams where a "Mercoid Fan Control" and a "Mercoid Limit Control" were used in conjunction with each other in heating systems which do not employ the elements specified in the Freeman patent as alleged in Paragraph 6 of the Complaint.

11. If the answer to interrogatory 10 is in the affirmative, state whether or not plaintiff can and will furnish the defendant with copies of such advertising matter or wiring diagrams and attach such copies to its answer to these interrogatories.

12. State whether or not plaintiff in the cartons or containers containing a "Mercoid Combination Fan and Limit Control" includes with said "Mercoid Combination Fan and Limit Control" any advertising literature, installation instructions, or wiring diagrams as to the method and manner of installing said "Mercoid Combination Fan and Limit Control" in a heating system.

13. If the answer to interrogatory 12 is in the affirmative, state whether or not plaintiff can and will furnish the defendant with copies of such advertising literature, in-
28 stallation instructions, or wiring diagrams as to the method and manner of installing said "Mercoid Combination Fan and Limit Control" in a heating system, and attach such copies to its answer to these interrogatories.

14. State whether or not plaintiff in the cartons or containers containing a "Mercoid Fan Control" includes with said "Mercoid Fan Control" any advertising literature, installation instructions, or wiring diagrams as to the method and manner of installing said "Mercoid Fan Control" in a heating system.

15. If the answer to interrogatory 14 is in the affirmative, state whether or not plaintiff can and will furnish the defendant with copies of such advertising literature, installation instructions, or wiring diagrams as to the method and manner of installing said "Mercoid Fan Control" in a heating system, and attach such copies to its answer to these interrogatories.

16. State whether or not plaintiff in the cartons or containers containing a "Mercoid Limit Control" includes with said "Mercoid Limit Control" any advertising literature, installation instructions, or wiring diagrams as to the method and manner of installing said "Mercoid Limit Control" in a heating system.

17. If the answer to interrogatory 16 is in the affirmative, state whether or not plaintiff can and will furnish the defendant with copies of such advertising literature, installation instructions, or wiring diagrams as to the method and manner of installing said "Mercoid Limit Control" in a heating system, and attach such copies to its answer to these interrogatories.

18. State whether or not the license form McCabe referred to in Paragraph 6 of the Complaint is in writing.

19. If the answer to interrogatory 18 is in the affirmative, state whether or not plaintiff can and will furnish the defendant with a copy of said license and attach such copy to its answer to these interrogatories.

Minneapolis-Honeywell Regulator Company,
By Bair & Freeman,
Attorneys for Defendant,
135 South La Salle Street,
Chicago, Illinois.

30 And on, to wit, the 28th day of August, A. D. 1940, came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Answer to Plaintiff's Interrogatories in words and figures following, to wit:

Filed August 1940

31 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

ANSWER TO PLAINTIFF'S INTERROGATORIES.

Comes now Minneapolis-Honeywell Regulator Company, the defendant herein, by C. B. Sweatt, an officer of said defendant, and answers plaintiff's interrogatories as follows:

1. Defendant installs on the premises of users, heating systems as defined by the claims of the Freeman Patent No. 1,813,732.

2. The controls necessary to said heating systems are manufactured by defendant.

3. Defendant in addition to installing on the premises of users heating systems, as defined by the claims of the Freeman patent No. 1,813,732, also sells controls, to manufacturers of heating equipment and dealers dealing in said heating equipment, necessary for such manufacturers
32 and dealers to install heating systems as defined by the claims of the Freeman patent No. 1,813,732.

4. Defendant publishes for distribution to the trade advertising matter in the form of catalogs describing the controls and the manner in which said controls are to be connected to install heating systems as defined by the claims of the Freeman patent No. 1,813,732.

5. Defendant attaches hereto its catalog (Form WA-2) including wiring diagrams.

6. A copy of the form of license agreement held by Penn Electric Switch Co., White-Rodgers Electric Company and Bendix Aviation Corporation (Friez Division) is attached hereto. Perfex Corporation and Cook Electric Company have forms of license agreements like plaintiff's Exhibit D.

7. In answer to interrogatory 7, see answer to interrogatory 6.

8-9-10-11 and 12. As to how each of defendant's licensees conducts its business, this defendant does not feel war-

ranted in saying under oath what it may know by hearsay only as to matters solicited by interrogatories 8 to 12.

C. B. Sweatt,
Vice-President of Minneapolis-Honeywell Regulator Company, the Defendant.

33 State of Minnesota, } ss.
County of Hennepin, }

I, C. B. Sweatt, being duly sworn on oath, state that I am Vice-President of the defendant above-named, and that I have answered the interrogatories propounded by plaintiff personally, because the defendant is a corporation.

C. B. Sweatt.

Subscribed and sworn to before me, a Notary Public in and for Hennepin County, Minnesota, this 21st day of August, 1940.

Muriel C. Burke,
(Seal) Notary Public.

34 And on, to wit, the 3rd day of September, A. D. 1940 came the Complainant by its attorneys and filed in the Clerk's office of said Court its certain Answer to Interrogatories in words and figures following, to wit:

35 In the District Court of the United States.

* * (Caption—1839) * *

COMPLAINANT'S ANSWER TO INTERROGATORIES PROPOUNDED BY DEFENDANT.

Now comes the complainant, The Mercoid Corporation, by its president, Hugh Courteol, and for its answer to defendant's interrogatories says:

1. The answer to defendant's interrogatory No. 1 is that The Mercoid Corporation first began the manufacture and made the first sale of the "Mercoid Combination Fan and Limit Control", type M-80, referred to in paragraph 6 of the complaint, on May 11, 1937.

2. The answer to defendant's interrogatory No. 2 is that complainant publishes for distribution to the trade advertising matter in the form of catalogues and the like describing or illustrating suggestions as to the manner in

which its said "Mercoid Combination Fan and Limit Control" may be installed in circuit with other controls of a heating system.

36 3. In answer to defendant's interrogatory No. 3, complainant attaches hereto copies of the following advertising matter which complainant has published for distribution to the trade describing or illustrating suggestions as to the manner in which its said "Mercoid Combination Fan and Limit Control", type M-80, may be installed in circuit with other controls of a heating system, marked, "Complainant's answer to interrogatory No. 3":

Mercoid Bulletin M-12
Mercoid Catalogue No. 300, Pages 7, 15 and 16
Mercoid Catalogue No. 400, Pages 9, 18 and 19.

4. The answer to defendant's interrogatory No. 4 is that complainant has published and distributed suggested wiring diagrams that may be used by the trade in installing said "Mercoid Combination Fan and Limit Control".

5. In answer to defendant's interrogatory No. 5, complainant refers to the wiring diagrams suggesting the manner in which the type M-80 may be installed as appearing in Mercoid Bulletin M-12; Mercoid Catalogue No. 300; and Mercoid Catalogue No. 400, attached hereto and marked, "Complainant's answer to interrogatory No. 3".

6. The answer to defendant's interrogatory No. 6 is that the wiring diagrams suggesting the manner in which the "Mercoid Combination Fan and Limit Control", type M-80, might be installed were first published and distributed

37 to the trade in Mercoid Bulletin M-12 during the month of June 1937.

7. In answer to defendant's interrogatory No. 7, complainant states that to the best of its information and belief, the first wiring diagram of any kind suggesting a manner of connecting a Mercoid Fan Control and a Mercoid Limit Control to cooperate with other controls in a heating system, as does the "Mercoid Combination Fan and Limit Control", was distributed to the trade during the year 1927.

8. In answer to defendant's interrogatory No. 8, complainant states that the "Mercoid Combination Fan and Limit Control", referred to in paragraph 6 of the complaint, is intended to cooperate with other controls in a heating system.

9. In answer to defendant's interrogatory No. 9, complainant states that it has no knowledge as to whether or

not the "Mercoid Combination Fan and Limit Controls" manufactured by complainant, when sold, are installed by the purchasers in accordance with the complainant's suggested wiring diagrams to cooperate with other controls to operate a heating system, as complainant does not install for any purpose controls sold by it.

10. The answer to defendant's interrogatory No. 10 is that the complainant has distributed advertising matter and suggested wiring diagrams where a Mercoid Furnace Control employed as a Fan Control is to be used in conjunction with a Mercoid Furnace Control employed as a Limit Control in a heating system.

38 11. In answer to defendant's interrogatory No. 11, complainant is attaching hereto copies of advertising matter and suggested wiring diagrams distributed to the trade where a Mercoid Furnace Control, employed as a Fan Control, is suggested to be used in conjunction with a Mercoid Furnace Control, employed as a Limit Control, marked, "Complainant's answer to interrogatory No. 11":

Blueprint Dwg. No. 266, "Wiring Diagram of Oil Burner Heating System with Warm Air Furnace Fan"
The Federal Guage Company Catalogue of 1927, Page 11
The Mercoid Catalogue No. "H"-3, 1928, Pages 23 and 28
The Mercoid Corporation Catalogue No. H5, 1929, Pages 24, 25, 31 and 32
Mercoid Bulletin S-83
The Mercoid Catalogue No. H5, 1930, Pages 24, 25, 31 and 32
Mercoid Bulletin A5
Mercoid Catalogue H-7, 1931, Pages 22, 23, 24, 25 and 107
Mercoid Bulletin M12, attached to complainant's answer to interrogatory No. 3
Mercoid Catalogue No. 300, attached to complainant's answer to interrogatory No. 3
Mercoid Catalogue No. 400, attached to complainant's answer to interrogatory No. 3

39 12. In answer to defendant's interrogatory No. 12, complainant states that installation instructions are placed in each shipping carton or container containing a "Mercoid Combination Fan and Limit Control".

13. In answer to defendant's interrogatory No. 13, complainant is attaching hereto a copy of "Installation Instructions" Form L-4, May 1940, for "Types M-80, M-82, M-84 Warm Air Combination Fan and Limit Controls",

placed in the shipping carton or container with each "Mercoid Combination Fan and Limit Control", marked, "Complainant's answer to interrogatory No. 13".

14. In answer to defendant's interrogatory No. 14, complainant states that installation instructions are placed in each shipping carton or container containing a "Mercoid Fan Control".

15. In answer to defendant's interrogatory No. 15, complainant is attaching hereto a copy of "Installation Instructions" Form P-55A, February 1940, for "Mercoid Warm Air Furnace Controls", placed in the shipping carton or container with each "Mercoid Furnace Control", for use as a Fan Control, marked, "Complainant's answer to interrogatory No. 15".

16. In answer to defendant's interrogatory No. 16, complainant states that installation instructions are placed in each shipping carton or container containing a "Mercoid Limit Control".

17. In answer to defendant's interrogatory No. 17, complainant is attaching hereto a copy of the "Installation Instructions" Form P-55A, February 1940, for "Mercoid Warm Air Furnace Controls", placed in the shipping carton or container with each "Mercoid Furnace Control", for use as a Limit Control, marked, "Complainant's answer to interrogatory 17".

18. In answer to defendant's interrogatory No. 18, complainant states that The Federal Guage Company is the predecessor in business of the complainant and the licenses from McCabe to The Federal Guage Company and from The Federal Guage Company to the complainant are in writing.

19. In answer to defendant's interrogatory No. 19, complainant is attaching hereto a copy of the license from Ira E. McCabe to The Federal Guage Company, the predecessor of the complainant, and from The Federal Guage Company to The Mercoid Corporation, marked, "Complainant's answer to interrogatory No. 19".

Hugh Courteol,
President, The Mercoid Corporation.

State of Illinois }
County of Cook } ss.

On this 3rd day of September, 1940, before me, the undersigned, a Notary Public within and for the County and State aforesaid, personally appeared Hugh Courteol and

made oath that he is the President of The Mercoid Corporation, the above-named Complainant; that he has read the foregoing Answer To Interrogatories Propounded by Defendant, and knows the contents thereof; and that the same is true, except as to those matters stated on information and belief, and as to those matters he believes them to be true.

Raymond March,
Notary Public.

(Seal.)

41 And on, to wit, the 17th day of October, A. D. 1940 came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Amendment to Answer in words and figures following, to wit:

42 IN THE DISTRICT COURT OF THE UNITED STATES.

* * * (Caption—1839) * * *

AMENDMENT TO ANSWER.

The defendant respectfully amends its answer heretofore filed herein by adding thereto the following:

14. Defendant further avers that there is now pending in this Court, between these parties, the case of Minneapolis-Honeywell Regulator Company vs. The Mercoid Corporation, Civil Action No. 1842. Since the filing of the answer herein, The Mercoid Corporation has filed in said cause No. 1842 its answer and counterclaim. That the pleadings in No. 1842 raise every issue which is raised by the pleadings in this case, and also raise additional issues which are not raised by the pleadings in this case.

Civil Action No. 1842 is at issue and has been assigned for trial.

43 Wherefore defendant prays this cause to be dismissed at plaintiff's costs.

Minneapolis-Honeywell Regulator Co,
By Bair & Freeman,
Its Attorneys.

Of Counsel:
W. P. Bair,
Will Freeman.

(Dated: October 17, 1940)

Service of the foregoing Amendment to Answer, and receipt of copy thereof, acknowledged this 17 day of October, 1940.

Langdon Moore,
Attorney for Plaintiff.

44 And on, to wit, the 24th day of October, A. D. 1940 came the Complainant by its attorneys and filed in the Clerk's office of said Court its certain Amendment to Bill of Complaint in words and figures following, to wit:

45 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

AMENDMENT TO BILL OF COMPLAINT.

Now comes The Mercoid Corporation, the complainant in the above-entitled cause of action and amends its bill of complaint as follows:

Page 6, paragraph 9, at the end of said paragraph and preceding the period (.) add the following:

Number	Date	Inventor
1,067,627	July 15, 1913	B. F. Teal
1,665,801	April 10, 1928	H. W. Sweatt
1,673,057	June 12, 1928	H. W. Sweatt
1,834,288	December 1, 1931	I. E. McCabe
1,991,680	February 19, 1935	D. J. Jones
Re.15,531	January 23, 1923	E. F. Edgecombe, Jr.

and described in the following printed publications:

Installation and Service Manual, Revised Edition to Include Model "J" Oil-O-Matic, of Williams Oil-O-Matic Heating Corporation, 1928.

Catalogue of Honeywell Heating Specialties Company, 1925-1926.

Catalogue of The Federal Guage Company, 1927.

Catalogue of The Mercoid Corporation, No. "H"-3, 1928.

Fuel Oil Journal, July 1929.

Catalogue Time-O-Stat Controls Company, For Oil Burners, 1929.

Catalogue The Mercoid Corporation, No. H-5, Revised Edition, 1929.

Page 6, paragraph 10, at the end of said paragraph and preceeding the period (.) add the following:

46 and by the employees of Williams Oil-O-Matic Heating Corporation in Bloomington, Illinois.

The Mercoid Corporation
By Langdon Moore
Its Attorney

Filed Jan. 7, 1941

47 And on, to wit, the 7th day of January, A. D. 1941, came the Complainant by its attorneys and filed in the Clerk's office of said Court its certain Supplemental Complaint in words and figures following, to wit:

48 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

SUPPLEMENTAL COMPLAINT.

The Mercoid Corporation, the complainant in the above entitled cause of action, brings its supplemental complaint herein, leave having been granted by the Court so to do, against Minneapolis-Honeywell Regulator Company, and says:

Since the filing of the original complaint herein, the following material facts have occurred:

1. Defendant admitted in its answer to the bill of complaint filed July 19, 1940, that it had granted licenses under the patent in suit to the following:

Perfex Corporation, Milwaukee, Wisconsin.
Penn Electric Switch Co., Goshen, Indiana.
White-Rodgers Electric Company, St. Louis, Missouri.
Cook Electric Company, Chicago, Illinois.
Bendix Aviation Corporation (Friez Division), South Bend, Indiana.

2. Defendant stated in its answer to complainant's interrogatories, filed August 28, 1940:

"A copy of the form of license agreement held by Penn Electric Switch Co., White-Rodgers Electric Company and Bendix Aviation Corporation (Friez Division) is at-
49 tached hereto. Perfex Corporation and Cook Electric Company have forms of license agreements like plaintiff's Exhibit D."

The license attached to this answer was in the form of a printed booklet, a copy of which is attached hereto and made a part hereof as Complainant's Exhibit H.

Defendant in its further answer to complainant's interrogatories, filed September 10, 1940, attached a copy of "Price Schedule—Exhibit A" forming a part of the license agreements referred to in its answer to the bill of complaint. This "Price Schedule—Exhibit A" is identical with that attached to and forming a part of the license sub-

mitted to The Mercoid Corporation. Complainant's Exhibit D.

3. Defendant filed a motion for an order to dismiss this cause of action, on October 17, 1940, supported by an affidavit of Mr. Will Freeman, of counsel for defendant. Said affidavit stated: the case of The Mercoid Corporation vs. Minneapolis-Honeywell Regulator Company, Civil Action No. 1839 (first case) was filed June 29, 1940, and the case of Minneapolis-Honeywell Regulator Company vs. The Mercoid Corporation, Civil Action No. 1842 (second case) was filed on July 1, 1940; that the parties are the same in the two cases and all of the issues of the first case have been raised and can be determined in the second case; that the second case involves additional issues; and all issues involved in litigation between the parties can be determined in the second case, but only part of the issues can be determined in the first case.

4. Defendant herein, Minneapolis-Honeywell Regulator Company, filed its bill of particulars in Civil Action No. 1842 on September 10, 1940, and specified that the
50 "Mercoid Combination Fan and Limit Control," No. M-80, illustrated in Mercoid Bulletin M-12, denotes the instrument alleged to infringe the Freeman patent No. 1,813,732; defendant further stated that the term "Furnace Control" is not met in Mercoid Bulletins S-83 and A-5, and that the wiring diagrams, illustrated in Mercoid Bulletin A-5, do not answer the term "Combination Control Wiring Diagrams," as used in its bill of complaint.

Copies of Mercoid Bulletins M-12, S-83 and A-5 are attached hereto and made a part hereof as Complainant's Exhibits I, J and K, respectively.

5. Defendant herein, Minneapolis-Honeywell Regulator Company in its answer to interrogatories filed in Civil Action No. 1842 on September 13, 1940, attached copies of the licenses granted each of the licensees under the Freeman patent No. 1,813,732 and referred to in defendant's answer to the bill of complaint herein. Defendant attached a copy of its "Price Schedule" to its answer to interrogatories and stated that identical "Price Schedules" were attached to each of said licenses. Said "Price Schedules" are identical with "Price Schedule—Exhibit A" attached to Complainant's Exhibit D.

The typewritten licenses to Perfex Corporation and to Cook Electric Company are, as above said, similar to Com-

plainant's Exhibit D and the licenses to Penn Electric Switch Co., White-Rodgers Electric Company and Bendix Aviation Corporation (Friez Division) are similar to the printed booklet, complainant's Exhibit H.

Therefore, The Mercoid Corporation, complainant herein, in addition to the averments made in the original complaint, makes the following averments herein:

51 14. Complainant avers that the license submitted to complainant by defendant under the Freeman patent, Complainant's Exhibit D, conveys to the licensee a non-exclusive right and license under the said Freeman patent to make, use and sell, a "Combination Furnace Control" and said license defines "Combination Furnace Control" in article I as follows:

"As used in this agreement, the expression 'Combination Furnace Control' shall mean a unitary structure including at least a switching means for controlling not less than two circuits and operated by temperature responsive means responsive to the temperature of a heating device or the fluid medium heated thereby, one of said circuits being established on temperature rise and another being established on temperature fall, the structure having permanent internal wiring connecting the switching means to terminals for the connection of external wires thereto, the internal wiring being so arranged that when the terminals are connected by external wires to a heat controlling mechanism or a combustion controlling mechanism for the heating device and to a means for controlling the circulation of the fluid medium heated thereby, such structure, when used as intended, embodies the system disclosed in and claimed by the Freeman patent No. 1,813,732."

15. Complainant, The Mercoid Corporation, is the exclusive licensee under the patents granted Ira E. McCabe upon pressure, vacuum and thermostatic electrical control apparatus, a copy of which license is attached hereto and made a part hereof as Complainant's Exhibit L.

16. Complainant upon information believes and therefore avers that defendant has granted licenses to Perfex Corporation, Milwaukee, Wisconsin; Penn Electric Switch Co., Goshen, Indiana; White-Rodgers Electric Company, St. Louis, Missouri; Cook Electric Company, Chicago,

52 Illinois; and Bendix Aviation Corporation (Friez Division), South Bend, Indiana, under said Freeman patent No. 1,813,732 to make, use and sell the "Combination

Furnace Control" as defined in the license submitted to complainant, Complainant's Exhibit D.

17. Complainant avers that the article defined as "Combination Furnace Control" in these licenses is not illustrated nor described in the said Freeman patent nor is it claimed per se in said Freeman patent and the granting of such licenses to make, use and sell said "Combination Furnace Control" under said Freeman patent sets up a monopoly beyond the boundaries of the Freeman patent No. 1,813,732.

18. Complainant avers that the "Combination Furnace Control" as defined in the license under the Freeman patent No. 1,813,732, submitted to the complainant, Complainant's Exhibit D, is not the invention of Freeman as the Furnace Control defined in said license was disclosed in printed publications of The Federal Guage Company and The Mercoid Corporation more than two years prior to the filing date of the said Freeman patent and said "Combination Furnace Control" is a simulation of a Furnace Control sold by complainant, and its predecessor in business, The Federal Guage Company, for more than 15 years past.

19. Complainant avers that defendant with its licensees has wilfully planned to set up a monopoly in Furnace Controls in simulation of complainant's Furnace Control, now and for more than 15 years past forming a part of
53 complainant's and its predecessor's regular line of controls offered the trade, under the guise of alleged patent protection under the patent in suit.

20. Complainant avers that defendant has deliberately conspired with its licensees and they have wilfully and wrongfully conspired unlawfully among themselves substantially to lessen competition and establish a monopoly in the sale of Furnace Controls in simulation of Furnace Controls previously sold by complainant and its predecessor, The Federal Guage Company, for more than 15 years past and by these unlawful acts have caused great injury to the business of the complainant and to the financial damage of the complainant.

21. Complainant avers that defendant has entered into unfair competition with complainant by granting licenses to others to make, use and sell a "Combination Furnace Control" defined in the license in words which describe all of the essential and non-essential features of the complainant's Furnace Controls which complainant and its

predecessor, The Federal Guage Company, have illustrated and advertised for more than 15 years past at great expense and by its careful manufacture have established a valuable good will and reputation for high grade Furnace Controls.

22. Complainant avers that it, and its predecessor in business, have been engaged in the manufacture and sale of pressure, vacuum and thermostatic electrical con-
54 trols since 1921, and have established a valuable good will and a high reputation for its controls and avers that the acts of defendant and its licensees, in the unfair competition above complained of, have resulted in irreparable injury and damage to the complainant.

23. Complainant is informed, and therefore avers that after granting three licenses similar to Complainant's Exhibit D, defendant distributed this license in printed form and submitted the printed form to supersede the typewritten form of license to the complainant and to defendant's licensees in accordance with the letter dated May 7, 1940, from defendant to complainant, a copy of which letter is attached hereto and made a part hereof as Complainant's Exhibit M, and that two of the former licensees executed this printed form and two other licensees executed this printed form.

24. Complainant avers that the letter of May 7, 1940, Complainant's Exhibit M, had attached to it copies of two letters to become a part of this printed form of license; one of these letters which became a part of the executed agreement expressed in the printed form reads as follows: "In connection with our license agreement to you under the Freeman patent No. 1,813,732, we agree that so long as you do not sell separate heating medium temperature responsive controls for carrying out the system of the Freeman patent at a combined price which is less than 25% higher than the prices set forth in the Price Schedule of the agreement for any specific 'Combination Furnace Control' comparable to carrying out in operation and func-
55 tion what the separate controls would do, we will not assert our rights against you or your customers under the Freeman patent on account of such sales."

25. Complainant therefore avers that defendant by making the above quoted paragraph a part of its printed form of license as executed by four of its licensees prior to said letter of May 7, 1940, Complainant's Exhibit M, has estab-

lished a price for the combined prices of a Limit Control and a Fan Control greater than the price of the "Combination Furnace Control" as defined in said license and specified in the "Price Schedule" forming a part of each of said licenses, in violation of the anti-trust laws.

26. Complainant avers that prior to January 1, 1940, it had determined to reduce the net price to manufacturers of its M-51, M-53 and M-80 Furnace Controls as the term "manufacturers" is defined in the "Price Schedule" attached to the proposed license, Complainant's Exhibit D, so advised the trade in advance and upon January 1, 1940, did reduce its prices of its Furnace Controls M-51, M-53 and M-80 whereby the combined price of the M-51 and M-53 for use in conjunction with each other and other controls in a heating system was less than 25% higher than the price set forth in the Price Schedule of the proposed license, Complainant's Exhibit D, for any specific "Combination Furnace Control." After complainant reduced its prices as abovesaid, defendant wrote the letter of May 7, 1940, Complainant's Exhibit M. Therefore, complainant further avers that defendant and its licensees have
56 wilfully and deliberately conspired to control the price of separate controls for use in the system illustrated and described in the Freeman patent.

27. Complainant herein, The Mercoid Corporation, avers that it filed its answer with counterclaim in Civil Action No. 1842 on September 20, 1940. A copy of Minneapolis-Honeywell Regulator Company's letter dated May 7, 1940, with additional clauses to be attached to said license agreements was attached to the aforesaid answer and made a part thereof. Said letter of May 7, 1940, with additional clauses is attached hereto and made a part hereof as Complainant's Exhibit M.

Complainant herein, The Mercoid Corporation, further avers that five months after the date of the aforesaid letter of May 7, 1940, and approximately two weeks after the filing of the aforesaid answer with counterclaim in Civil Action No. 1842 by The Mercoid Corporation, the defendant herein, Minneapolis-Honeywell Regulator Company, made an attempt to evade the allegation of price maintenance by a statement in a letter addressed to the complainant herein, dated October 7, 1940. A copy of said letter of October 7, 1940, is attached hereto and made a part hereof as Complainant's Exhibit N.

28. Complainant herein, The Mercoid Corporation, therefore avers that defendant herein, Minneapolis-Honeywell Regulator Company, by the statement in its letter of October 7, 1940, Complainant's Exhibit N, is wilfully and in bad faith attempting to excuse its violation of the anti-trust laws of the United States and escape the penalty therefor.

57 Wherefore, The Mercoid Corporation, complainant herein, prays:

(i) That this Honorable Court may enter a declaratory decree adjudging that the defendant has engaged in unfair competition with the complainant to the complainant's injury and damage;

(j) That this Honorable Court may enter a declaratory decree that defendant has granted licenses to others to set up a monopoly beyond the scope of the Freeman patent No. 1,813,732 in restraint of trade and in violation of the anti-trust laws of the United States;

(k) That this Honorable Court may enter a declaratory decree that the defendant has wilfully planned to set up a monopoly in Furnace Controls in simulation of Furnace Controls forming a part of complainant's and its predecessor's regular line for more than 15 years past, under the guise of alleged patent protection in restraint of trade;

(l) That this Honorable Court may enter a declaratory decree that defendant has deliberately conspired with its licensees and said licensees and the defendant have wilfully and unlawfully conspired among themselves substantially to lessen competition and establish a monopoly in the sale of Furnace Controls in simulation of Furnace Controls previously sold by complainant and its predecessor in business, The Federal Gauge Company, for more than 15 years past, in restraint of trade and in violation of the anti-trust laws of the United States;

58 (m) That this Honorable Court may enter a declaratory decree that defendant has admitted by its letter of October 7, 1940, Complainant's Exhibit N, the violation of the anti-trust laws of the United States;

(n) That this Honorable Court may enter a decree that an accounting be awarded to complainant of defendant's profits, gains and advantages, and the damage sustained by defendant because of defendant's wrongful and unlawful acts;

(o) That this Honorable Court may enter a decree that

complainant recover from defendant three-fold the damages by it sustained on account of the unlawful restraint of trade and violation of the anti-trust laws of the United States and recover a reasonable attorney's fee;

(p) That this Honorable Court may enter a decree awarding a permanent injunction restraining and enjoining the defendant, its officers, agents, attorneys, servants, employees and all others acting by and under its direction or authority, its successors or assigns, from bringing suit for infringement of said Freeman patent No. 1,813,732, against the complainant, or complainant's customers prospective customers, or directly or indirectly threatening complainant, or complainant's customers or prospective customers with suit for infringement of the Freeman patent No. 1,813,732, or from, in any manner, interferring with complainant's business;

In addition to the relief prayed for in the original complaint herein.

The Mercoid Corporation,
By Langdon Moore,
Its Attorney,
53 West Jackson Boulevard,
Chicago, Illinois.

59 And on, to wit, the 28th day of January, A. D. 1941, came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Answer to Supplemental Complaint in words and figures following, to wit:

60 In the District Court of the United States.

* * (Caption—1839) * *

ANSWER TO PLAINTIFF'S SUPPLEMENTAL COMPLAINT.

Now comes Minneapolis-Honeywell Regulator Company hereinafter referred to as the defendant, and for answer to the Supplemental Complaint of the plaintiff, filed herein, admits, denies and avers as hereinafter set forth.

As to Paragraphs 1 to 5 of the Supplemental Complaint, defendant neither admits nor denies them since they are directed to subject-matter which apparently the plaintiff does not intend to include in its Supplemental Complaint, said Supplemental Complaint starting with Paragraph 14.

Defendant, therefore, disregards Paragraphs 1 to 5 on pages 1, 2 and 3 of the Supplemental Complaint since the Supplemental Complaint itself starts with the paragraph numbered 14.

1. Defendant admits the submission of a form of license agreement under the Freeman Patent No. 1,813,732, said proposed license agreement corresponding to plain-
61 tiff's Exhibit D as alleged in Paragraph 14 of Plaintiff's Supplemental Complaint.

2. Defendant alleges that it is without knowledge or information sufficient to form a belief as to the truth of the allegations contained in Paragraph 15 of the plaintiff's Supplemental Complaint, and therefore denies the same and alleges that they are immaterial.

3. Defendant admits that it has granted licenses under the Freeman Patent No. 1,813,732 to Perfex Corporation, Milwaukee, Wisconsin; Penn Electric Switch Co., Goshen, Indiana; White-Rodgers Electric Company, St. Louis, Missouri; Cook Electric Company, Chicago, Illinois; and Bendix Aviation Corporation (Friez Division), South Bend, Indiana as alleged in Paragraph 16 of plaintiff's Supplemental Complaint.

4. Defendant denies the allegations contained in Paragraph 17 of plaintiff's Supplemental Complaint; denies that the "Combination Furnace Control" defined in the licenses is not claimed in the Freeman patent and denies that the licenses set up a monopoly beyond the boundaries of the Freeman Patent.

5. Defendant denies the allegations contained in Paragraph 18 of plaintiff's Supplemental Complaint; denies that the "Combination Furnace Control" defined in the license submitted to plaintiff is not the invention of Freeman; denies that such control is disclosed in publications of Federal Gauge Company and Mercoid Corporation two years before Freeman's filing date or simulates controls sold by plaintiff and its predecessor.

6. Defendant denies the allegation contained in Paragraph 19 of plaintiff's Supplemental Complaint and defendant alleges that it asserts only its rights under its Freeman Patent No. 1,813,732.

62 7. Defendant denies the allegation contained in Paragraph 20 of plaintiff's Supplemental Complaint; denies any conspiracy of any kind with its licensees and denies that it has been a party to any conspiracy that has worked damage or injury to plaintiff.

8. Defendant denies the allegation contained in Paragraph 21 of plaintiff's Supplemental Complaint and denies that it has "entered into unfair competition with plaintiff by granting licenses to others, or in any way."

9. Defendant admits that plaintiff and its predecessor in business have been engaged in the manufacture and sale of controls since 1921 and denies any acts on the part of defendant has resulted in unfair competition or that defendant's acts have caused any injury or damage to the plaintiff as alleged in Paragraph 22 of plaintiff's Supplemental Complaint.

10. Defendant admits that it has granted licenses as alleged in Paragraph 23 of plaintiff's Supplemental Complaint, except that the letter referred to read—25¢—instead of 25%—, and denies that the allegations of Paragraph 23 are material.

11. Defendant denies that it entered into any agreement with plaintiff and denies that the letters included with plaintiff's letter of May 7, 1940, plaintiff's Exhibit M became any part of any agreement with plaintiff.

Defendant further alleges that the term "25%" as alleged in Paragraph 24 of plaintiff's Supplemental Complaint was a typographical error on the part of defendant in its correspondence with plaintiff and said term of "25%" should have been "25¢."

63 12. Defendant denies the allegation contained in Paragraph 25 of plaintiff's Supplemental Complaint, denies that it has established any prices in violation of the Anti-Trust Laws.

13. Defendant alleges that it is without knowledge or information sufficient to form a belief as to the truth of the allegation of Paragraph 26 of plaintiff's Supplemental Complaint with regard to plaintiff's determination to reduce its price of its controls and that defendant's letter of May 7, 1940, plaintiff's Exhibit M, was written after said price reduction, and defendant denies the allegation that defendant and its licensees have wilfully and deliberately conspired to control the price of separate controls for use in the system illustrated and described in the Freeman patent.

14. Defendant, answering the allegation contained in Paragraph 27 of plaintiff's Supplemental Complaint, admits it sent a letter to plaintiff dated October 7, 1940, plaintiff's Exhibit N.

Defendant avers that its letter of October 7, 1940 was sent to plaintiff for the purpose of calling attention to a typographical error appearing in the letter of May 7, 1940, plaintiff's Exhibit M, as alleged.

15. Defendant, answering Paragraph 28 of plaintiff's Supplemental Complaint, denies that its letter of October 7, 1940, plaintiff's Exhibit N, was sent in bad faith and avers that said letter of October 7, 1940, plaintiff's Exhibit N, was sent to correct a typographical error found in the letter of May 7, 1940, plaintiff's Exhibit M, and defendant therefore denies the allegation of said para-
64 graph.

Wherefore, defendant prays
That this cause be dismissed with costs.

Minneapolis-Honeywell Regulator Company,
By Bair & Freeman,
Attorneys for Defendant.

Of Counsel:
W. P. Bair.
Will Freeman.

Received a copy of the foregoing Answer to Plaintiff's Supplemental Complaint this 27th day of January, 1941.

Langdon Moore,
Attorney for Plaintiff.

65 And on, to wit, the 20th day of February, A. D. 1941, came the Complainant by its attorneys and filed in the Clerk's office of said Court its certain Request for Admission of Facts and Genuineness of Documents in words and figures following, to wit:

66 In the District Court of the United States.

* * (Caption—1839) * *

REQUEST FOR ADMISSION OF FACTS AND GENUINENESS OF DOCUMENTS UNDER RULE 36, RULES OF CIVIL PROCEDURE.

The Mercoid Corporation, complainant in the above entitled cause, requests defendant, Minneapolis-Honeywell Regulator Company, to make the following admissions for the purpose of this action only:

1. That each of the following documents, enumerated with this request, is genuine.

(a) The letter, a photostat of which is attached to the bill of complaint as "Exhibit B," dated November 28, 1932, from Minneapolis-Honeywell Regulator Co. addressed to Mercoid Corporation and signed by H. W. Sweatt, Vice-Pres. & Gen. Mgr.

(b) The letter, a photostat of which is attached to the bill of complaint as "Exhibit C," dated January 24, 1940, from Minneapolis-Honeywell Regulator Co. to Mr.
67 Courteol, The Mercoid Corp. and signed by W. L. Huff, Vice-Pres. & Treasurer.

(c) The letter, a photostat of which is attached to the bill of complaint as "Exhibit E," dated June 21, 1940, from Minneapolis-Honeywell Regulator Co. addressed to Mr. Ira E. McCabe, Mercoid Corporation and signed by "Willard" over the typewritten name W. L. Huff, Vice-Pres. & Treasurer.

(d) The letter with two sheets attached thereto, a photostat of which is attached to the supplemental bill of complaint as "Exhibit M," dated May 7, 1940, from Minneapolis-Honeywell Regulator Co. addressed to Mr. C. J. Swan, Detroit Lubricator Company and Mr. Ira E. McCabe, Mercoid Corporation and signed W. L. Huff, Vice-President & Treasurer.

(e) The letter, a photostat of which is attached to the supplemental bill of complaint as "Exhibit N," dated October 7, 1940, from Minneapolis-Honeywell Regulator Co. addressed to Mr. Ira E. McCabe, Mercoid Corporation and signed W. L. Huff, Vice-Pres. & Treasurer.

2. That each of the following facts is true.

(a) That the signature to the said letter dated November 28, 1932, a photostat of which is attached to the bill of complaint as "Exhibit B," is the signature of H. W. Sweatt, or was authorized by him to be signed thereto for him; that said H. W. Sweatt was the Vice-President and General Manager of Minneapolis-Honeywell Regulator Co. at the time said letter was signed; and that the statements made in said letter were made by H. W.
68 Sweatt in the course of persuing his duties as Vice-President and General Manager.

(b) That the signatures to the said letters, photostats of which are attached to the bill of complaint as "Exhibit C," "Exhibit E," "Exhibit M" and "Exhibit N," are the signatures of W. L. Huff, or were authorized by him to be signed thereto for him; that said W. L. Huff was Vice-President and Treasurer of Minneapolis-Honeywell

Regulator Co. at the time said letters were signed; and that the statements made in said letters were made by W. L. Huff in the course of performing his duties as Vice-President and Treasurer.

The Mercoid Corporation,
By Langdon Moore,
Its Attorney,
53 West Jackson Boulevard,
Chicago, Illinois.

69 And on, to wit, the 12th day of November, A. D. 1941, came the Complainant by its attorneys and filed in the Clerk's office of said Court its certain Amendment to Complainant's Supplemental Complaint in words and figures following, to wit:

Filed Nov. 12, 1941

70 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

AMENDMENT TO COMPLAINANT'S SUPPLEMENTAL COMPLAINT UNDER RULE 15, RULES OF CIVIL PROCEDURE.

Now comes The Mercoid Corporation, the complainant in the above entitled cause of action, after having obtained leave of Court, and amends its supplemental complaint as follows:

Page 5, paragraph 19, line 3, after "monopoly" insert *in restraint of trade or commerce among the several states.*

Page 6, paragraph 20, line 5, after "Furnace Controls" insert *in interstate commerce.*

Page 10, Prayer (j), line 4, after "trade" insert *or commerce among the several states.*

Same page, Prayer (k), line 3, after "monopoly" insert *in restraint of trade or commerce among the several states.*

Same page, Prayer (l), line 5, after "competition" insert *in interstate commerce*; line 9, after "trade" insert *or commerce among the several states.*

The Mercoid Corporation,
By Langdon Moore,
Its Attorney,
53 West Jackson Boulevard,
Chicago, Illinois.

71 Pleas in the District Court of the United States for the Northern District of Illinois, Eastern Division, begun and held at the United States Court Room, in the City of Chicago, in said District and Division, before the Honorable John P. Barnes, District Judge of the United States for the Northern District of Illinois on 24th day of March, A., in the year of our Lord one thousand nine hundred and forty-two, being one of the days of the regular March Term of said Court, begun Monday, the 2nd day of March, and of our Independence the 166th year. Placita

Present: Honorable John P. Barnes, District Judge.

William H. McDonnell,
U. S. Marshal.

Hoyt King, Clerk.

72 IN THE DISTRICT COURT OF THE UNITED STATES.

* * * (Caption—1839) * *

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Be It Remembered, that the above-entitled action was commenced by the filing of the following Complaint in the above-entitled cause, in the office of the Clerk of the District Court of the United States for the Northern District of Illinois, Eastern Division, on this the 1st day of July, A. D. 1940.

73 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1842) * *

COMPLAINT.

To the Honorable Judges of the United States District Court, in and for the Northern District of Illinois, Eastern Division, in the Seventh Circuit:

Plaintiff, Minneapolis-Honeywell Regulator Company, of Minneapolis, Minnesota, for its Complaint against The Mercoid Corporation, of Chicago, Illinois, Defendant, alleges:

1. This is a suit arising under the patent laws of the United States for infringement of United States Letters Patent issued to Edward E. Freeman, No. 1,813,732 dated July 7, 1931, upon an application filed January 16,
74 1931, and Plaintiff seeks the equitable remedy of an injunction and asks for an accounting of profits and an award for damages.

2. Plaintiff, Minneapolis-Honeywell Regulator Company, is a corporation of Delaware with a regular and established place of business at Minneapolis, Minnesota.

3. Defendant, The Mercoid Corporation, is a corporation of Delaware with a regular and established place of business at 4201 Belmont Avenue, Chicago, Illinois, within the Northern Judicial District of Illinois.

4. On January 16, 1931, Edward E. Freeman being the first, original and sole inventor of certain improvements in Furnace Controls, filed in the United States Patent Office, his application for Letters Patent thereon, Serial No. 509,049.

5. On July 7, 1931 United States Letters Patent No. 1,813,732 for said invention were duly issued to said Ed-

ward E. Freeman. A copy of said Freeman patent No. 1,813,732 is attached hereto and marked "Plaintiff's Exhibit 1."

6. That by written instrument dated April 14, 1932 and duly recorded in Liber U152, Page 95 of the Transfers of Patents of the United States Patent Office on May 13, 1932 said Edward E. Freeman assigned his entire right, title and interest in and to said invention and in and to said Letters Patent No. 1,813,732, together with all claims and demands in law or equity for past infringement of said patent, to Minneapolis-Honeywell Regulator Company of Minneapolis, Minnesota. A copy of said assignment is hereto attached and marked "Plaintiff's Exhibit 2."

75 7. That the aforesaid invention of said Letters Patent No. 1,813,732 is of great utility and value and that a large number of Furnace Controls embodying the invention of said Letters Patent have been manufactured and sold by Plaintiff, and licensees of the Plaintiff; and that said invention is of great benefit and advantage to the public; and that subsequent to the issue of said Letters Patent manufacturers of Furnace Controls have acknowledged and acquiesced in said Letters Patent.

8. That Defendant, The Mercoid Corporation, has had full knowledge of said Letters Patent No. 1,813,732 and its infringement of said Letters Patent.

9. That Defendant, The Mercoid Corporation, manufactures and sells, and has advertised and offered for sale, Furnace Controls in accordance with Bulletin M12 published in 1937 and entitled "Mercoid Combination Fan and Limit Control for Warm Air Furnaces". A photostatic copy of said Bulletin M12 as heretofore published and circulated by the Defendant is hereto attached and marked "Plaintiff's Exhibit 3."

10. Defendant, since the issue of said Letters Patent and within six years prior to the filing of this Complaint, unlawfully and without license has infringed and contributed to the infringement of said Letters Patent and Plaintiff's rights thereunder by making, using and selling, and causing to be made, used and sold, Furnace Controls embodying the invention of said Letters Patent, and that by so making, using and selling Furnace Controls, Defendant has caused and contributed to the cause of others

76 infringing said Letters Patent; and that by so infringing and contributing to the infringement of said Let-

ters Patent, Defendant has realized and received gains and profits which otherwise would have been received by Plaintiff.

11. That Defendant, in common with its manufacture and sale of Furnace Controls in infringement of said Letters Patent No. 1,813,732, has heretofore circulated and threatens to continue to circulate "Combination Control Wiring Diagrams" as shown on Plaintiff's Exhibit 3, by which Defendant contributes to the infringement of said Freeman patent by encouraging others to use and install Furnace Controls, manufactured and sold by this Defendant for installation by such others, in accordance with said "Combination Control Wiring Diagrams" circulated and generally distributed by this Defendant to users of its Furnace Controls.

12. That Defendant is continuing and threatens to continue the infringing acts and contributory infringing acts herein complained of and by reason of said infringement and contributory infringement and continued threats of infringement and contributory infringement Plaintiff has been greatly damaged and the injury to Plaintiff is irreparable and for such injury and damage Plaintiff has no adequate remedy at law.

Wherefore Plaintiff prays:

(1) That a decree be signed and entered by this Honorable Court holding, declaring and adjudging that Edward E. Freeman is the true, first, sole and original inventor of the invention set forth and described in said Letters Patent No. 1,813,732 and of all material and substantial parts
77 thereof; and that the entire right, title and interest in and to the invention of said Letters Patent No. 1,813,732 is vested in the Plaintiff, Minneapolis-Honeywell Regulator Company, and that Defendant has infringed and contributed to the infringement upon the claims thereof.

(2) That this Honorable Court award a permanent injunction and a preliminary injunction during the pendency of this suit restraining and enjoining the Defendant, its officers, agents, attorneys servants, employees and all others acting by and under its direction or authority, its successors or assigns, from using or causing to be used, from selling or causing to be sold, Furnace Controls made in accordance with and embodying the invention of said Freeman patent No. 1,813,732 and from infringing upon or contributing to the infringement upon or violating the invention of said Letters Patent in any way whatsoever.

(3) That an accounting be awarded to Plaintiff of Defendant's profits, gains and advantages and the damages sustained by Plaintiff because of Defendant's infringement upon said Letters Patent.

(4) That Defendant be required to pay the costs of this suit.

(5) That Plaintiff have such other and further relief as is just.

Minneapolis-Honeywell Regulator Company,
By W. L. Huff,
Vice-President.

Bair & Freeman,
Attorneys for Plaintiff,
Room 1400, Field Building,
135 South La Salle Street,
Chicago, Illinois.

Will Freeman,
W. P. Bair,
Of Counsel.

78 And on, to wit, the 23rd day of August, A. D. 1940 came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Motion for a Bill of Particulars in words and figures following, to wit:

Filed Aug. 1940

* * (Caption—1842) * *

79 DEFENDANT'S MOTION FOR A BILL OF PARTICULARS.

Now comes The Mercoid Corporation, the defendant in the above entitled cause, before filing answer to plaintiff's bill of complaint, and moves that the plaintiff herein, Minneapolis-Honeywell Regulator Company, be ordered to furnish a more detailed statement of the meaning of the term "Furnace Controls" as used in paragraphs 7, 9, 10 and 11 of the plaintiff's bill of complaint and for an order for a bill of particulars under Rule 12 (e), Rules of Civil Procedure, as to the following matters alleged herein:

The term "Furnace Controls" as used by the plaintiff in the said paragraphs is indefinite and confusing because the patent in suit is entitled "Furnace Control" and illustrates and describes three (3) separate and distinct instruments for controlling a furnace, namely, a room thermostat,

a warm air furnace limit control and a warm air fur-
80 nace fan control while the defendant's Bulletin M-12, referred to in paragraphs 9 and 11 of the bill of complaint, illustrates and describes but two (2) separate and distinct instruments for controlling the operation of a furnace, namely, a room thermostat and Type M-80 Mercoid Fan and Limit Control. Therefore, the defendant moves that:

1. The plaintiff be required to state more definitely and with more particularity the meaning of the term "Furnace Controls" as used in paragraphs 7, 9, 10 and 11 of the bill of complaint, and to state whether or not the "Furnace Controls" illustrated and described in defendant's Bulletin S-83 and in defendant's Bulletin A-5, copies of which are attached hereto and make a part hereof, answer the term "Furnace Controls" as used in paragraphs 7, 9, 10 and 11 of the bill of complaint.

2. The plaintiff be required to state more definitely and with more particularity the meaning of the terms "Combination Wiring Diagrams" as used in paragraph 11 of the bill of complaint, and to state whether or not the wiring diagrams illustrated in defendant's said Bulletin A-5, including the Mercoid Furnace Control and the separate and distinct Mercoid Furnace Fan Control, answer the term "Combination Wiring Diagrams" as used in the paragraph 11 of the bill of complaint.

The Mercoid Corporation
By Langdon Moore
Its Attorney
53 West Jackson Boulevard
Chicago, Illinois

(August 23, 1940)

81 And on, to wit, the 5th day of September, A. D. 1940 came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Interrogatories in words and figures following, to wit:

Filed Sept. 1940

82 IN THE DISTRICT COURT OF THE UNITED STATES.

(Caption—1842)

INTERROGATORIES PROPOUNDED BY DEFENDANT UNDER RULE 33 RULES OF CIVIL PROCEDURE.

Now comes the defendant in the above entitled cause, by its solicitor, and propounds the following interrogatories to the plaintiff under the provisions of Rule 33, "Rules of Civil Procedure"; answer under oath by officer of plaintiff corporation is hereby waived:

1. State the name and address of each of the licensees under Letters Patent No. 1,813,732 referred to in paragraph 7 of the bill of complaint.

2. State the dates upon which the licenses under said Letters Patent No. 1,813,732 were granted to each of the licensees referred to in paragraph 7 of the bill of complaint.

3. State whether or not the licenses granted under
83 the said Letters Patent No. 1,813,732 referred to in paragraph 7 of the bill of complaint are all similar and identical as to form and terms.

4. If the answer to interrogatory No. 3 is in the affirmative, state whether or not the plaintiff can and will furnish the defendant with a copy of such license and attach a copy of said license to its answer to this interrogatory.

5. If the answer to interrogatory No. 3 is in the negative, state whether or not the plaintiff can and will furnish the defendant with copies of the licenses granted each licensee and attach copies of such licenses to its answer to this interrogatory.

6. State whether or not "Price Schedules" are attached to each of the licenses granted under Letters Patent No. 1,813,732 referred to in paragraph 7 of the bill of complaint.

7. If the answer to interrogatory No. 6 is in the affirmative, state whether or not the plaintiff can and will furnish the defendant with copies of said "Price Schedules" at-

tached to each of the licenses granted the licensees under Letters Patent No. 1,813,732 referred to in paragraph 7 of the bill of complaint and attach copies of said "Price Schedules" to its answer to this interrogatory.

8. If the answer to interrogatory No. 6 is in the
84 negative, state whether or not the plaintiff has furnished "Price Schedules" to the said licensees subsequent to the granting of said licenses.

9. If the answer to interrogatory No. 8 is in the affirmative, state whether or not the plaintiff can and will furnish copies of said "Price Schedules" to the defendant and attach copies of such "Price Schedules" to its answer to this interrogatory.

10. State whether or not the plaintiff has furnished furnace controls embodying the invention of Letters Patent No. 1,813,732 to any of its licensees referred to in paragraph 7 of the bill of complaint.

11. If the answer to interrogatory No. 10 is in the affirmative, state by name and address the licensees to which it has sold furnace controls embodying the invention of Letters Patent No. 1,813,732 as referred to in paragraph 7 of the bill of complaint.

The Mercoid Corporation
By Langdon Moore
Attorney for Defendant
53 West Jackson Boulevard
Chicago, Illinois

85 And on, to wit, the 10th day of September, A. D. 1940 came the Plaintiff by its attorneys and filed in the Clerk's office of said Court its certain Bill of Particulars in words and figures following, to wit:

Filed Sept. 10, 1940

86 IN THE DISTRICT COURT OF THE UNITED STATES.

• • (Caption—1842) • •

PLAINTIFF'S BILL OF PARTICULARS.

Comes now the plaintiff, Minneapolis-Honeywell Regulator Company, and files this its Bill of Particulars in answer to Defendant's Motion For A Bill Of Particulars, filed August 23, 1940.

1. Answering defendant's Motion, Paragraph 1, the term "Furnace Controls" as used in Paragraph 7 of the Complaint is the title of the patent in suit used in the plural.

The term "Furnace Controls" as used in Paragraphs 9, 10 and 11 of the Complaint, denotes the instrument or instruments made and sold by defendant charged to infringe and contribute to the infringement, and in Paragraph 9 denotes a specific instrument known as the "Mercoid Combination Fan and Limit Control" illustrated in its Bulletin M-12, plaintiff's Exhibit 3, and known also as defendant's Type No. M-80.

87 Defendant has asked whether or not the "Furnace Controls" illustrated and described in defendant's Bulletin S-83 and in defendant's Bulletin A-5 answer the term "Furnace Controls" as used in Paragraphs 7, 9, 10 and 11 of the Complaint; and plaintiff, answering said portion of defendant's Paragraph 1 of its Motion, states that the term "Furnace Controls" as used in the Complaint is met by the term "Furnace Controls" used by defendant in its current Bulletin P-55A published in February of 1940, and current Bulletin L-4 published in March of 1939, wherein there are disclosed wiring diagrams for installation of control instruments embodying the subject-matter of the Freeman patent, and the term "Furnace Controls" is not met in discontinued Bulletins S-83 and A-5 when the instruments therein disclosed and referred to are used and arranged in accordance with the disclosure of said Bulletin S-83 and Bulletin A-5.

2. Answering defendant's Motion, Paragraph 2, the term "Combination Wiring Diagrams" has not been used in Paragraph 11 of the Complaint, but assuming that defendant refers to the term "Combination Control Wiring Diagrams" as used in Paragraph 11 of the Complaint, then the term as used refers to the diagrams published in defendant's Bulletin M-12, Plaintiff's Exhibit 3, attached to the Complaint and referred to in Paragraph 11.

Defendant has asked whether or not the "wiring diagrams" illustrated in defendant's Bulletin A-5 answers the term "Combination Wiring Diagrams"; and plaintiff answering said portion of defendant's Paragraph 2 of its Motion, states that they do not answer the term "Com-
88 bination Control Wiring Diagrams" as used in Paragraph 11 of the Complaint.

Minneapolis-Honeywell Regulator Company,
By Bair & Freeman,
Its Attorneys.
Room 1400, Field Building,
135 South LaSalle Street,
Chicago, Illinois.

Of Counsel:
W. P. Bair,
Will Freeman.

89 And on, to wit, the 13th day of September, A. D. 1940, came the Plaintiff by its attorneys and filed in the Clerk's office of said Court its certain Answer to Interrogatories in words and figures following, to wit:

90 In the District Court of the United States.

• • (Caption—1842) • •

PLAINTIFF'S ANSWER TO INTERROGATORIES PROPOUNDED BY DEFENDANT.

Now comes the plaintiff, Minneapolis-Honeywell Regulator Company, by its Vice-President, C. B. Sweatt, and for its answer to defendant's interrogatories, states:

1. The names and addresses of each of the licensees of plaintiff under Letters Patent No. 1,813,732 referred to in Paragraph 7 of the Complaint is as follows:

Perfex Corporation,
Milwaukee, Wisconsin,

Penn Electric Switch Co.,
Goshen, Indiana,

White-Rodgers Electric Company,
St. Louis, Missouri,

Cook Electric Company,
Chicago, Illinois; and

Bendix Aviation Corporation,
(Friez Division),
South Bend, Indiana.

91 2-3-4 and 5. The answers to defendant's interrogatories 2 to 5 inclusive are as follows:

A conformed copy of Cook Electric Company license agreement is attached hereto.

Penn Electric Switch Co. under date of May 9, 1939 executed a license agreement corresponding to said Cook Electric Company license agreement. The original Penn Electric Switch Co. agreement of May 9, 1939 was superseded by a printed form of agreement, a conformed copy of said printed agreement is attached hereto.

Perfex Corporation under date of April 18, 1939 executed a license agreement corresponding to said Cook Electric Company license agreement. The original Perfex Corporation agreement of April 18, 1939 was superseded by a printed form of agreement, a conformed copy of said printed agreement is attached hereto.

A conformed copy of Bendix Aviation Corporation agreement dated as of April 1, 1940 is attached hereto.

A conformed copy of White-Rodgers Electric Company agreement dated as of April 1, 1940 is attached hereto.

6. In answer to interrogatory 6, identical Price Schedules are attached to each of the licenses granted under Letters Patent No. 1,813,732.

7. In answer to interrogatory 7, a copy of the Price Schedule referred to in answer to interrogatory 6 is attached hereto.

8. In answer to interrogatory 8, plaintiff has not furnished Price Schedules to licensees subsequent to the granting of licenses.

92 9. Plaintiff having answered interrogatory 8 in the negative, no answer for 9 is required.

10-11. Answering defendant's interrogatories 10 and 11, plaintiff states that it does not and has not sold furnace controls embodying the invention of Letters Patent No. 1,813,732 to any of the licensees referred to in Paragraph 7 of the Complaint for resale purposes by said licensees.

Minneapolis-Honeywell Regulator Company,
By C. B. Sweatt,
Vice-President.

Bair & Freeman,
Attorneys for Plaintiff,
Room 1400, 135 South La Salle Street,
Chicago, Illinois.
Will Freeman,
Of Counsel.

93 And on, to wit, the 20th day of September, A. D. 1940, came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Answer in words and figures following, to wit:

94 IN THE DISTRICT COURT OF THE UNITED STATES.

• • (Caption—1842) • •

DEFENDANT'S ANSWER TO PLAINTIFF'S BILL OF COMPLAINT AS AMENDED.

The defendant, The Mercoid Corporation for answer to the Complaint filed in the above-entitled cause says:

1. Defendant admits the jurisdiction of this Court, but denies that it has infringed or contributed to the infringement of the Letters Patent set forth in the bill of complaint, within this jurisdiction or elsewhere within the United States.

2. Defendant admits the allegations contained in paragraphs 2 and 3 of the bill of complaint.

3. Defendant admits, on information and belief, the allegations of paragraphs 4 and 5 of the bill of complaint, but denies that said Freeman was the inventor of any alleged invention or improvement covered by said Let-
95 ters Patent No. 1,813,732.

4. Defendant has no knowledge as to the allegations of paragraph 6 of the bill of complaint and, therefore, leaves the plaintiff to its proof thereof.

5. Defendant denies the allegations of paragraph 7 of the bill of complaint and leaves the plaintiff to its proof thereof.

6. In answer to paragraph 8 of the bill of complaint, defendant avers that it has had full knowledge of said Letters Patent No. 1,813,732 since the receipt of the notice of infringement dated November 28, 1932, a copy of which is attached hereto and made a part hereof as defendant's "Exhibit A," but denies that it has infringed or contributed to the infringement of said Letters Patent No. 1,813,732.

7. Defendant admits the allegations of paragraph 9 of the bill of complaint.

8. Defendant denies each and every allegation of paragraph 10 of the bill of complaint and leaves the plaintiff to its proof thereof.

9. In answer to paragraph 11 of the bill of complaint, defendant admits that in connection with its manufacture and sale of Furnace Controls it has circulated wiring diagrams suggesting a manner of connecting its Furnace Controls to cooperate with other controls in a heating system but denies that it has infringed or contributed to the infringement of the Letters Patent set up in the bill of complaint and leaves the plaintiff to its proof thereof.

96 10. In answer to paragraph 12 of the bill of complaint, defendant avers that it has neither directly infringed or contributed to the infringement of said Letters Patent No. 1,813,732, or claims thereof, alleged in the bill of complaint to have been infringed by defendant, and hence, nothing has occurred to be remedied in law or equity.

11. Defendant, further answering the bill of complaint, avers that inasmuch as the defendant and its predecessor in business, The Federal Guage Company, manufactured and sold Furnace Controls long prior to November 28, 1932, and as the plaintiff was fully acquainted with the actions of the defendant complained of herein long prior to the date of its notice to the defendant dated November 28, 1932, defendant's "Exhibit A," plaintiff has forfeited any and all rights it may otherwise have had to enforce said Letters Patent No. 1,813,732 against the defendant on the ground of laches.

Defendant, further answering the bill of complaint, avers that plaintiff, after notifying defendant in 1932 of the infringement of the Freeman patent No. 1,813,732, wilfully

and in bad faith delayed instituting suit under said Freeman patent until most of the installations made before that date employing Mercoid Furnace Controls had become worn-out or obsolete and replaced, and until the whereabouts of witnesses to such earlier installations became unknown or the witnesses had become deceased greatly reducing the possibility of defendant obtaining evidence of such prior uses. Therefore, defendant further avers plaintiff is estopped from obtaining the
97 equitable relief prayed in its bill of complaint.

12. Defendant, further answering the bill of complaint, avers that the Furnace Controls manufactured by the defendant alleged to infringe and contribute to the infringement of said Freeman patent No. 1,813,732 are made and sold by the defendant under a license and in accordance with the disclosure and claims of Letters Patent granted to Ira E. McCabe, which license was recorded on April 21, 1922, Liber W 116, page 12 of Transfers of Patents, U. S. Patent Office, and defendant further avers that the Mercoid Warm Air Furnace Controls were on the market and offered for sale long prior to the filing date of the application of said Freeman patent.

13. Defendant, further answering the bill of complaint, avers that in view of the prior state of the art at the time of the alleged invention covered by Letters Patent No. 1,813,732 alleged to have been infringed by the defendant, in view of the then common knowledge and practice in the United States in the art to which said invention relates and in analogous arts, and in view of the then existing Letters Patent and printed publications illustrating and describing said art, the alleged invention and the alleged improvement described and claimed in said Letters Patent No. 1,813,732 was not a patentable invention within the statutes of the United States and was the product of the exercise of ordinary mechanical skill, and that said Letters Patent is therefore void.

98 14. Defendant, further answering, avers, on information and belief, that the claims of the said Letters Patent No. 1,813,732 alleged in the bill of complaint to be infringed by defendant, and each of them, are so limited and restricted by the prior art as to exclude the defendant's devices alleged by the plaintiff to infringe or contribute to the infringement of said Letters Patent No. 1,813,732, and plaintiff is therefore estopped from obtain-

ing such broad construction of said Letters Patent as will include defendant's structures complained of.

15. Defendant, further answering, avers plaintiff is utilizing the Freeman patent No. 1,813,732 to establish a monopoly in the sale of a Combination Furnace Control per se not coming within the boundaries of the said Freeman patent.

16. Defendant, further answering, avers plaintiff is seeking to exercise its patent monopoly under said Freeman patent No. 1,813,732 so as to effect a limited monopoly in the sale of a Combination Furnace Control whereby plaintiff seeks to derive its profits not from the invention claimed in the patent in suit, but from mechanism unpatented per se by the plaintiff, and hence, plaintiff should be refused the aid of this court.

17. Defendant, further answering, avers, on information and belief, that plaintiff's method of doing business has the purpose of doing by indirection what it could not do directly, i.e., the securing of a monopoly in the manufacture and sale of a Furnace Control not coming within the boundaries of said Freeman patent owned by plaintiff, and plaintiff therefore is asserting a monopoly not warranted by its patent and is not entitled to the relief prayed for.

99

18. Defendant, further answering, avers that the claims of the Letters Patent alleged in the bill of complaint to have been infringed by defendant do not cover any valid and patentable combination, but embrace mere aggregations of elements having no true and proper relation or combination in a patentable sense, and that they do not cover, embody, or constitute patentable subject matter, and are therefore invalid in accordance with the statutes and laws of the United States.

19. (a) Defendant is informed and therefore believes, and therefore avers, that the alleged invention, or improvement claimed in said Letters Patent No. 1,813,732 had been, prior to the alleged invention thereof by said Freeman, disclosed in correspondence of The Federal Guage Company, the predecessor in business of the defendant, during 1926.

(b) Defendant is informed and therefore believes, and therefore avers, that the alleged invention or any improvement described and claimed in said Letters Patent No. 1,813,732 had been, prior to the alleged invention thereof by said Freeman, patented or described in various Letters Patents of the United States as follows:

Name	*Number*	*Date*
E. H. Johnson	360,223	March 29, 1887
W. H. Kilbourn	479,761	July 26, 1892
B. F. Teal	1,067,627	July 15, 1913
E. F. Edgecombe, Jr.	1,138,854	May 11, 1915
F. A. Kuntz	1,193,271	Aug. 1, 1916
J. C. Johnson	1,602,363	Oct. 5, 1926
100 H. W. Sweatt	1,665,801	April 10, 1928
H. W. Sweatt	1,673,057	June 12, 1928
W. M. Cross	1,758,146	May 13, 1930
I. E. McCabe	1,834,288	Dec. 1, 1931
D. J. Jones	1,991,680	Feb. 19, 1935
E. F. Edgecombe, Jr.	Re. 15,531	Jan. 23, 1923

and described in the following printed publications:

Installation and Service Manual, Revised Edition to Include Model "J" Oil-O-Matic, of Williams Oil-O-Matic Corporation, 1928.

Catalogue of Honeywell Heating Specialties Company, 1925-1926.

Catalogue of The Federal Guage Company, 1927.

Catalogue of The Mercoid Corporation, No. "H"-3, 1928.

Fuel Oil Journal, July 1929.

Catalogue Time-O-Stat Controls Company, For Oil Burners, 1929.

Catalogue The Mercoid Corporation, No. H-5, Revised Edition, 1929.

(c) Defendant, further answering, avers that said Edward E. Freeman was not the original and first inventor or discoverer of any material or substantial part of the alleged invention described and claimed in the said Letters Patent No. 1,813,732 but said alleged invention and all material and substantial parts thereof were previously made by and known to the applicants of the Letters Patents recited in the preceding paragraph as early as the dates of the respective applications.

(d) Defendant, further answering, avers that the alleged invention or discovery claimed in said Letters Patent No. 1,813,732 had been known to the sales engineers of The Mercoid Corporation and its predecessors in business, The Federal Guage Company, and others long prior

to the filing date of the application of the said patent.

101 (e) Defendant, further answering, avers that the alleged invention or discovery described and claimed in said Letters Patent No. 1,813,732 had been known to and made by W. L. Dreyfus, Frank Fillo, and J. A. Portner prior to the alleged invention by said Freeman and had been put in public use by said W. L. Dreyfus, in San Francisco, California; Frank Fillo, in St. Louis, Missouri; and J. A. Portner, in Wheaton, Illinois long before the filing of the application for said patent.

20. Defendant, further answering, denies that it has done any act or thing, or is doing any act or thing, and proposes to do any act or thing, in violation of any alleged right, exclusive or otherwise, of plaintiff, or secured to plaintiff by Letters Patent, infringement of which is alleged in the bill of complaint, or that plaintiff is entitled to an injunction or to an accounting, or to any other relief, prayed for in its bill of complaint.

Therefore, defendant prays:

That the bill of complaint be dismissed, and that defendant recover its costs in this behalf most wrongfully sustained, and any other and further relief as to this court may seem meet and proper in the premises.

102 DEFENDANT'S COUNTERCLAIM.

Defendant sets forth and alleges the following as a counterclaim against the plaintiff herein, to wit:

21. Defendant, The Mercoid Corporation, is, as alleged in the bill of complaint, a corporation of Delaware, having a regular and established place of business at 4201 Belmont Avenue, Chicago, Illinois within the northern judicial district of Illinois, and, upon information and belief, plaintiff, Minneapolis-Honeywell Regulator Company, is, as alleged in the bill of complaint, a corporation of Delaware with a regular and established place of business at Minneapolis, Minnesota.

22. The jurisdiction of this court arises from the fact that an actual controversy which exists between plaintiff and defendant arises under the patent laws of the United States and arises further under the anti-trust laws of the United States.

23. Plaintiff avers that on January 16, 1931, Edward E. Freeman being the first, original and sole inventor of

certain improvements in Furnace Controls, filed in the United States Patent Office, his application for Letters Patent thereon, Serial No. 509,049; that on July 7, 1931, United States Letters Patent No. 1,813,732 for said invention were duly issued to said Edward E. Freeman; that by written instrument dated April 14, 1932 and duly recorded in Liber U152, Page 95 of the Transfers of
103 Patents of the United States Patent Office on May 13, 1932 said Edward E. Freeman assigned his entire right, title and interest in and to said invention and in and to said Letters Patent No. 1,813,732, together with all claims and demands in law or equity for past infringement of said patent, by Minneapolis-Honeywell Regulator Company of Minneapolis, Minnesota.

24. Plaintiff alleges and defendant denies that The Mercoid Corporation, since the issuance of said Letters Patent and within six years prior to the filing of this complaint, unlawfully and without license has infringed and contributed to the infringement of said Letters Patent and plaintiff's rights thereunder by making, using and selling and causing to be made, used and sold Furnace Controls embodying the invention of said Letters Patent and that by so making, using and selling Furnace Controls, defendant has caused and contributed to the cause of others infringing said Letters Patent; and that by so infringing and contributing to the infringement of said Letters Patent, defendant has realized and received gains and profits which otherwise would have been received by plaintiff.

25. Defendant avers that the claims of said Letters Patent, alleged in the bill of complaint to be infringed by the defendant, are void and invalid at law for each of the reasons set forth in paragraphs 13 to 19, inclusive,
104 of the answer herein to which reference is made here with the same force and effect as if each of the said paragraphs thereof had been herein again set forth in full and that there is an actual controversy relative to the plaintiff's patent rights.

26. Defendant avers that conferences have been held between officers of the plaintiff corporation and representatives and officers of the defendant corporation, as shown by the letter from the plaintiff to the defendant, dated January 24, 1940, (a copy of which is attached hereto as defendant's "Exhibit B" and made a part hereof). During one of these conferences, plaintiff submitted to defend-

ant a proposed license agreement in typewritten form on or about the first part of the year 1940, (a copy of which license agreement with price schedule attached is attached hereto as defendant's "Exhibit C" and made a part hereof). Plaintiff, on June 21, 1940, notified defendant, "The question of your company taking a license under the Freeman patent has been dragging along. . . . In view of your failure to reach a decision on the matter we have no choice but to enter suit, and this we expect to do on July 1.",
(a copy of which letter is attached hereto as defendant's "Exhibit D" and made a part hereof).

27. Defendant avers that the Furnace Controls charged to infringe the said Freeman patent, as furnished by the defendant to the trade, include patented Furnace Con-
105 trols covered per se by the McCabe patent No. 1,834,-288, December 1, 1931, (a copy of which is attached hereto, defendant's "Exhibit E" and made a part hereof) and are furnished to the trade under a license from McCabe. The Mercoid Fan Control and the Mercoid Limit Control are trade names applied by The Mercoid Corporation to the same Furnace Control constructed in accordance with the said McCabe patent, defendant's "Exhibit E," which become Mercoid Fan Controls with one setting and Mercoid Limit Controls with another setting. The Mercoid Combination Fan and Limit Control combines the two settings in the same unit. Defendant, The Mercoid Corporation, has sold both the Mercoid Fan Control instrument and the Mercoid Limit Control instrument for use separately and in conjunction with each other and other instruments in heating systems long prior to the filing date of the Freeman patent in suit. These Furnace Controls are generally sold by the defendant to manufacturers and dealers of coal stokers, oil burners, gas burners, and other heating apparatus. Defendant, The Mercoid Corporation, does not sell nor install complete heating apparatus in which its patented devices form a part.

28. Defendant avers that the license submitted to defendant by plaintiff under the Freeman patent, defendant's "Exhibit C," conveys to the licensee a non-exclusive right and license under the said Freeman patent to make, use and sell, a "Combination Furnace Control" and said
106 license defines "Combination Furnace Control" in article I as follows:

"As used in this agreement, the expression 'Combination Furnace Control' shall mean a unitary structure including at least a switching means for controlling not less than two circuits and operated by temperature responsive means responsive to the temperature of a heating device or the fluid medium heated thereby, one of said circuits being established on temperature rise and another being established on temperature fall, the structure having permanent internal wiring connecting the switching means to terminals for the connection of external wires thereto, the internal wiring being so arranged that when the terminals are connected by external wires to a heat controlling mechanism or a combustion controlling mechanism for the heating device and to a means for controlling the circulation of the fluid medium heated thereby, such structure, when used as intended, embodies the system disclosed in and claimed by the Freeman patent No. 1,813,732."

29. Defendant, The Mercoid Corporation, is the exclusive licensee under the patents granted Ira E. McCabe upon pressure, vacuum and thermostatic electrical control apparatus, a copy of which license is attached hereto and made a part hereof as defendant's "Exhibit F".

30. Defendant upon information believes and therefore avers that plaintiff has granted licenses to Perfex Corporation, Milwaukee, Wisconsin; Penn Electric Switch Co., Goshen, Indiana; White Rodgers Electric Company, St. Louis, Missouri; Cook Electric Company, Chicago, Illinois; and Bendix Aviation Corporation (Friez Division), South Bend, Indiana, under said Freeman patent No. 1,813,732 to make, use and sell the "Combination Furnace Control" 107 as defined in the license submitted to defendant, defendant's "Exhibit C".

31. Defendant avers that the article defined as "Combination Furnace Control" in these licenses is not illustrated nor described in the said Freeman patent nor is it claimed per se in said Freeman patent and the granting of such licenses to make, use and sell said "Combination Furnace Control" under said Freeman patent sets up a monopoly beyond the boundaries of the Freeman patent No. 1,813,732.

32. Defendant avers that the "Combination Furnace Control" as defined in the license under the Freeman patent No. 1,813,732, submitted to the defendant, defendant's "Exhibit C", is not the invention of Freeman as the Fur-

nace Control defined in said license was disclosed in printed publications of The Federal Guage Company and The Mercoid Corporation more than two years prior to the filing date of the said Freeman patent and said "Combination Furnace Control" is a simulation of a Furnace Control sold by defendant, and its predecessor in business, The Federal Guage Company, for more than 15 years past.

33. Defendant avers that plaintiff with its licensees has wilfully planned to set up a monopoly in Furnace Controls in simulation of defendant's Furnace Control, now and for more than 15 years past forming a part of defendant's and its predecessors regular line of controls offered the trade, under the guise of alleged patent protection under the patent in suit.

108 34. Defendant avers that plaintiff has deliberately conspired with its licensees and they have wilfully and wrongfully conspired unlawfully among themselves to substantially lessen competition and establish a monopoly in the sale of Furnace Controls in simulation of Furnace Controls previously sold by defendant and its predecessor, The Federal Guage Company, for more than 15 years past and by these unlawful acts have caused great injury to the business of the defendant and to the financial damage of the defendant.

35. Defendant avers that plaintiff has entered into unfair competition with defendant by granting licenses to others to make, use and sell a "Combination Furnace Control" defined in the license in words which describe all of the essential and non-essential features of the defendant's Furnace Controls which defendant and its predecessor, The Federal Guage Company, have illustrated and advertised for more than 15 years past at great expense and by its careful manufacture have established a valuable good will and reputation for high grade Furnace Controls.

36. Defendant avers that it, and its predecessor in business, have been engaged in the manufacture and sale of pressure vacuum and thermostatic electrical controls since 1921 and have established a valuable good will and a high reputation for its controls and avers that the acts of plaintiff and its licensees, in the unfair competition above complained of, have resulted in irreparable injury and damage to the defendant.

109 37. Defendant is informed, and therefore avers, that after granting three licenses similar to defend

ant's "Exhibit C", plaintiff distributed this license in printed form and submitted the printed form to supersede the typewritten form license to the defendant and to plaintiff's licensees in accordance with the letter dated May 7, 1940, from plaintiff to defendant, a copy of which letter is attached hereto and made a part hereof as defendant's "Exhibit G", and that two of the former licensees executed this printed form and two other licensees executed this printed form.

38. Defendant avers that the letter of May 7, 1940, defendant's "Exhibit G", had attached to it copies of two letters to become a part of this printed form of license; one of these letters which became a part of the executed agreement expressed in the printed form reads as follows: "In connection with our license agreement to you under the Freeman Patent No. 1,813,732, we agree that so long as you do not sell separate heating medium temperature responsive controls for carrying out the system of the Freeman patent at a combined price which is less than 25% higher than the prices set forth in the Price Schedule of the agreement for any specific 'Combination Furnace Control' comparable to carrying out in operation and function what the separate controls would do, we will not assert our rights against you or your customers under the Freeman patent on account of such sales."

39. Defendant therefore avers that plaintiff, by making the above quoted paragraph a part of its printed form as executed by four of its licensees prior to said letter of May 7, 1940, defendant's "Exhibit G", has established a price for the combined prices of a Limit Control and a Fan Control greater than the price of the "Combination Furnace Control" as defined in said license and specified in the "Price Schedule" forming a part of each of said licenses, in violation of the anti-trust laws.

40. Defendant avers that prior to January 1, 1940, it had determined to reduce the net price of its M-51, M-53 and M-80 Furnace Controls to manufacturers, as the term "manufacturers" is defined in the "Price Schedule" attached to the proposed license, defendant's "Exhibit C", so advised the trade in advance and upon January 1, 1940, did reduce its prices of its Furnace Controls M-51, M-53 and M-80 whereby the combined price of the M-51 and M-53 for use in conjunction with each other and other controls in a heating system was less than 25% higher than the

price set forth in the Price Schedule of the proposed license, defendant's "Exhibit C", for any specific "Combination Furnace Control". After defendant reduced its prices as above said, plaintiff wrote the letter of May 7, 1940, defendant's "Exhibit G". Therefore, defendant further avers that plaintiff and its licensees have wilfully and deliberately conspired to control the price of separate controls for use in the system illustrated and described in the Freeman patent.

111 Wherefore, defendant prays:

(a) That this Honorable Court declare the rights of plaintiff and defendant and their respective legal relations in connection with the matter of the controversy herein set forth;

(b) That this Honorable Court may enter a declaratory decree adjudging that the plaintiff is not entitled to extend its patent monopoly beyond the boundaries described in the claims of the Freeman patent No. 1,813,732 to include the defendant's Fan and Limit Controls not patented by the plaintiff;

(c) That this Honorable Court may enter a declaratory decree adjudging that the defendant's Fan and Limit Controls as specified herein, do not infringe nor contribute to the infringement of the plaintiff's patent No. 1,813,732;

(d) That this Honorable Court may enter a declaratory decree adjudging that plaintiff's patent No. 1,813,732 is invalid;

(d) That this Honorable Court may enter a declaratory decree adjudging that the defendant has the right to manufacture and sell its Fan and Limit Controls, as specified herein, without molestation by the plaintiff;

(f) That this Honorable Court may enter a declaratory decree adjudging that the plaintiff has engaged in unfair competition with the defendant to defendant's injury and damage;

(g) That this Honorable Court may enter a declaratory decree that plaintiff has granted licenses to others to
112 set up a monopoly beyond the scope of the Freeman patent No. 1,813,732 in restraint of trade and in violation of the anti-trust laws;

(h) That this Honorable Court may enter a declaratory decree that the plaintiff has wilfully planned to set up a monopoly in Furnace Controls in simulation of Furnace Controls forming a part of defendant's and its predeces-

sor's regular line for more than 15 years past, under the guise of alleged patent protection in restraint of trade;

(i) That this Honorable Court may enter a declaratory decree that plaintiff has deliberately conspired with its licensees and said licensees and the plaintiff have wilfully and unlawfully conspired among themselves to substantially lessen competition and establish a monopoly in the sale of Furnace Controls in simulation of Furnace Controls previously sold by defendant and its predecessor in business, The Federal Guage Company, for more than 15 years past, in restraint of trade and in violation of the anti-trust laws;

(j) That this Honorable Court may enter a decree that an accounting be awarded to defendant of plaintiff's profits, gains and advantages, and the damage sustained by defendant because of plaintiff's wrongful, and unlawful acts;

(k) That this Honorable Court may enter a decree that defendant recover from plaintiff three-fold the dam-
113 ages by it sustained on account of the unlawful restraint in trade and violation of the anti-trust laws and recover a reasonable attorneys fee;

(l) That this Honorable Court may enter a decree awarding a permanent injunction and a preliminary injunction during the pendency of this suit restraining and enjoining the plaintiff, its officers, agents, attorneys, servants, employees and all others acting by and under its direction or authority, its successors or assigns, from bringing suit for infringement of said Freeman patent No. 1,813,732 against the defendant's customers or prospective customers, or directly or indirectly threatening defendant's customers or prospective customers with suit for infringement of the Freeman patent No. 1,813,732, or from, in any manner, interfering with defendant's business;

(m) And such other and further relief as to this Honorable Court may seem meet and proper in the premises; that the plaintiff may be decreed to pay the costs of this proceedings.

The Mercoid Corporation
By Langdon Moore
—Its Attorney—
53 West Jackson Boulevard
Chicago, Illinois

114 And on, to wit, the 3rd day of October, A. D. 1940, came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Amendment to Answer With Counterclaim in words and figures following, to wit:

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Oct.
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* * (Caption—1842) * *

115 AMENDMENT TO ANSWER WITH COUNTERCLAIM.

The defendant before reply to its Answer With Counterclaim, amends its Answer heretofore filed as follows:

Page 8, paragraph 19 (e), at the end of said paragraph and preceding the period (.) add—*and further avers said invention described and claimed in said Letters Patent No. 1,813,732 had been put in public use by the employees of the Williams Oil-O-Matic Heating Corporation in Bloomington, Illinois, for more than two years prior to the filing of the application for said Letters Patent.*

The Mercoid Corporation,
By Langdon Moore,
Its Attorney.

Chicago, Illinois,
October 3, 1940.

Received a copy of the foregoing Amendment this 3rd day of October, 1940.

Bair & Freeman,
Attorneys for Plaintiff.

116 And on, to wit, the 14th day of October, A. D. 1940, came the Plaintiff by its attorneys and filed in the Clerk's office of said Court its certain Reply in words and figures following, to wit:

117 IN THE DISTRICT COURT OF THE UNITED STATES.

* * * (Caption—1842) * * *

REPLY TO DEFENDANT'S COUNTERCLAIM.

1. Plaintiff admits the allegations contained in Paragraph 21 of defendant's Counterclaim.

2. Plaintiff admits the allegation contained in Paragraph 22 of defendant's Counterclaim that jurisdiction arises under the patent laws of the United States and denies the allegation that a controversy exists as between plaintiff and defendant under the Anti-Trust Laws of the United States as alleged in said paragraph.

3. Plaintiff admits the allegation contained in Paragraph 23 of defendant's Counterclaim.

4. Plaintiff in reply to Paragraph 24 of defendant's Counterclaim realleges that defendant, since the issue of said Letters Patent and within six years prior to the filing of this Complaint, unlawfully and without license has
118 infringed and contributed to the infringement of said Letters Patent and plaintiff's rights thereunder by making, using and selling, and causing to be made, used and sold, Furnace Controls embodying the invention of said Letters Patent, and that by so making, using and selling Furnace Controls, defendant has caused and contributed to the cause of others infringing said Letters Patent; and that by so infringing and contributing to the infringement of said Letters Patent, defendant has realized and received gains and profits which otherwise would have been received by plaintiff.

5. Plaintiff denies that the claims of said Letters Patent No. 1,813,732 are void for the reasons set forth in Paragraphs 13 to 19 of defendant's Answer and alleges that said Patent No. 1,813,732 and the claims thereof are good and valid.

6. Plaintiff admits the allegation contained in Paragraph 26 of defendant's Counterclaim and alleges that defendant not having taken a license under said Freeman

patent No. 1,813,732, plaintiff brought this suit against defendant in accordance with its letter of June 21, 1940, defendant's Exhibit D.

7. Plaintiff alleges that it is without knowledge or information sufficient to form a belief as to the truth of the allegations contained in Paragraph 27 of defendant's Counterclaim and therefore denies the same, and plaintiff asserts that said allegations are immaterial to the issue here involved.

8. Plaintiff admits the submission of a form of license agreement under the Freeman patent No. 1,813,732, said proposed license agreement corresponding to defendant's Exhibit C as alleged in Paragraph 28 of defendant's Counterclaim.

119 9. Plaintiff alleges that it is without knowledge or information sufficient to form a belief as to the truth of the allegations contained in Paragraph 29 of the defendant's Counterclaim and therefore denies the same, and alleges that they are immaterial.

10. Plaintiff admits that it has granted licenses under Freeman patent No. 1,813,732 to Perfex Corporation, Milwaukee, Wisconsin; Penn Electric Switch Co., Goshen, Indiana, White-Rodgers Electric Company, St. Louis, Missouri; Cook Electric Company, Chicago, Illinois; and Bendix Aviation Corporation (Friez Division), South Bend, Indiana, as alleged in Paragraph 30 of defendant's Counterclaim.

11. Plaintiff denies the allegations contained in Paragraph 31 of defendant's Counterclaim; denies that the "Combination Furnace Control" defined in the licenses is not claimed in the Freeman patent and denies that the licenses set up a monopoly beyond the boundaries of the Freeman patent.

12. Plaintiff denies the allegations contained in Paragraph 32 of defendant's Counterclaim; denies that the "Combination Furnace Control" defined in the license submitted to defendant is not the invention of Freeman; denies that such control is disclosed in publications of Federal Gauge Company and Mercoid Corporation two years before Freeman's filing date or simulates controls sold by defendant and its predecessor.

13. Plaintiff denies the allegation contained in Paragraph 33 and plaintiff alleges that it asserts only its rights under its Freeman patent, No. 1,813,732.

120 14. Plaintiff denies the allegation contained in Paragraph 34 of defendant's Counterclaim; denies any conspiracy of any kind with its licensees and denies that it has been party to any conspiracy which has worked damage or injury to defendant.

15. Plaintiff denies the allegation contained in Paragraph 35 of defendant's Counterclaim; denies that it has —"entered into unfair competition with defendant, by granting licenses to others, or in any way."

16. Plaintiff admits that defendant and its predecessor in business have been engaged in the manufacture and sale of controls since 1921 and denies that any acts on the part of the plaintiff has resulted in unfair competition or that plaintiff's acts have caused any injury or damage to the defendant.

17. Plaintiff admits that it has granted licenses as alleged in Paragraph 37 of defendant's Counterclaim, except that the letter referred to read—"25¢"—instead of—"25%"—and denies that the allegations of Paragraph 37 are material.

18. Plaintiff denies that it entered into any agreement with defendant and denies that the letters included with plaintiff's letter of May 7, 1940, defendant's Exhibit G, became any part of any agreement with defendant.

Plaintiff further alleges that the term "25%" as alleged in Paragraph 38 of defendant's Counterclaim was a typographical error on the part of plaintiff in its correspondence with defendant and said term of "25%" should have been—"25¢."

121 19. Plaintiff denies the allegation contained in Paragraph 39 of defendant's Counterclaim, denies that it has established any prices in violation of the Anti-Trust laws.

20. Plaintiff alleges that it is without knowledge or information sufficient to form a belief as to the truth of the allegation with regard to defendant's determination to reduce its price of its controls and that plaintiff's letter of May 7, 1940, defendant's Exhibit G, was written after said price reduction, and plaintiff denies the allegation that plaintiff and its licensees have willfully and deliberately conspired to control the price of separate controls for use in the system illustrated and described in the Freeman patent.

Wherefore, plaintiff prays
As in its original Complaint and that defendant's Counterclaim be dismissed with costs.

Minneapolis-Honeywell Regulator Company,
By (Sgd) Bair & Freeman,
Its Attorneys.

Of Counsel
(Sgd) W. P. Bair.
(Sgd) Will Freeman.

122 And on, to wit, the 20th day of February, A. D. 1941, came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Request for Admission of Facts and Genuineness of Documents in words and figures following, to wit:

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Feb
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* * (Caption—1842) * *

123 REQUEST FOR ADMISSION OF FACTS AND GENUINENESS OF DOCUMENTS UNDER RULE 36, RULES OF CIVIL PROCEDURE.

The Mercoid Corporation, defendant in the above entitled cause, requests plaintiff, Minneapolis-Honeywell Regulator Company, to make the following admissions for the purpose of this action only:

1. That each of the following documents, enumerated with this request, is genuine.

(a) The letter, a photostat of which is attached to the answer to the bill of complaint as "Exhibit A," dated November 28, 1932, from Minneapolis-Honeywell Regulator Co. addressed to Mercoid Corporation and signed by H. W. Sweatt, Vice-Pres. & Gen. Mgr.

(b) The letter, a photostat of which is attached to the answer to the bill of complaint as "Exhibit B," dated January 24, 1940, from Minneapolis-Honeywell Regulator Co. to Mr. Courteol, The Mercoid Corp. and signed by W. L. Huff, Vice-Pres. & Treasurer.

124 (c) The letter, a photostat of which is attached to the answer to the bill of complaint as "Exhibit D," dated June 21, 1940, from Minneapolis-Honeywell Regulator Co. addressed to Mr. Ira E. McCabe, Mercoid Corporation and signed by "Willard" over the typewritten name W. L. Huff, Vice-Pres. & Treasurer.

(d) The letter, a photostat of which is attached to the answer to the bill of complaint as "Exhibit G," dated May 7, 1940, from Minneapolis-Honeywell Regulator Co. addressed to Mr. C. J. Swan, Detroit Lubricator Company and Mr. Ira E. McCabe, Mercoid Corporation and signed W. L. Huff, Vice-President & Treasurer.

2. That each of the following facts is true.

(a) That the signature to the said letter dated November 28, 1932, a photostat of which is attached to the answer to the bill of complaint as "Exhibit A," is the signature of H. W. Sweatt, or was authorized by him to be signed thereto for him; that said H. W. Sweatt was the Vice-President and General Manager of Minneapolis-Honeywell Regulator Co. at the time said letter was signed; and that the statements made in said letter were made by H. W. Sweatt in the course of persuing his duties as Vice-President and General Manager.

(b) That the signatures to the said letters, photostats of which are attached to the answer to the bill of complaint as "Exhibit B," "Exhibit D," and "Exhibit G," are the signatures of W. L. Huff, or were authorized by him to be signed thereto for him; that said W. L. Huff was Vice-President and Treasurer of Minneapolis-Honeywell Regulator Co. at the time said letters were signed; and that
125 the statements made in said letters were made by W. L. Huff in the course of performing his duties as Vice-President and Treasurer.

The Mercoid Corporation,
By Langdon Moore,
Its Attorney.

126 And afterwards, to wit, on the 19th day of June, A. D. 1941, being one of the days of the regular June term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable John P. Barnes, District Judge, appears the following entry, to wit:

Entered June 19, 1941

127 United States District Court

Office of the Clerk

Chicago

Date: June 20, 1941

Re: Minneapolis-Honeywell Regulator Co.
vs
Mercoid Corporation
Case No. 1842

Gentlemen:

Judge Barnes entered the following order on June 19, 1941.

Order that this cause and cause No. 1839—Mercoid Corporation vs. Minneapolis-Honeywell Regulator Co. be consolidated and that said consolidated cause proceed under the name and title of Cause No. 1839—Mercoid Corporation vs. Minneapolis-Honeywell Regulator Co., and that said consolidated cause be set for trial November 10, 1941.

Yours very truly,

Hoyt King, Clerk.

128 And on, to wit, the 14th day of October, A. D. 1942, there was filed in the Clerk's office of said Court a certain Transcript of Testimony in words and figures following, to wit:

129 HUGH COURTEOL, called as a witness on behalf of the Mercoid Corporation, having been first duly sworn, testified as follows: :

Direct Examination by Mr. Moore.

Q. Mr. Courteol, will you please state your name, age, residence and occupation?

A. Hugh Courteol; 44; 2200 Harrison Street, Evanston, Illinois; occupation, president, Mercoid corporation.

The Court: Spell your name, please.

The Witness: C-o-u-r-t-e-o-l.

Mr. Moore: Q. How long have you been president of The Mercoid Corporation?

A. Since February, 1938.

Q. And what is the business of The Mercoid Corporation?

A. The manufacture of automatic and electrical controls for use in the heating industry and for many other uses.

Q. Do you know how long Mercoid Corporation has been engaged in the manufacture and sale of these controls?

A. With its predecessor company since 1921.

Q. What was the name of the predecessor company?

A. Federal Gauge Company.

Q. Now, how does The Mercoid Corporation at the present time sell these controls to manufactures?

130 A. It sells its controls through dealers, distributors, jobbers, and through manufacturers of equipment of which they become accessory parts.

Q. Is there any distinction between distributors and jobbers and dealers?

A. Yes, there is the distinction that a distributor may buy a stock of controls and make sales down through the other channels of jobbers and dealers.

Q. What are jobbers?

A. Jobbers are a form of middleman who generally, as we know them, have an order placed with them and refer to us with an order and get a unit and make the delivery.

Q. And the dealer?

A. The dealer often is an individual who installs the equipment as sold him by the manufacturer, or he might peddle or sell the items themselves, but he is a dealer, he is somewhat the last link in the chain of distribution to the consumer.

Q. Can you name one of the distributors for the Mercoid Corporation?

A. Well, I could name the Detroit Lubricator Company.

Q. Any others?

A. Yes, I could name the Jensen Instrument Company in Los Angeles. There are quite a number of such dis-
131 tributors around the country.

Q. Now, does Mercoid Corporation install these controls that it sells?

A. No, it does not. It has a policy of not making installations. We have perhaps twelve or fifteen salesmen around the country who sell four or five hundred thousand devices a year. Quite obviously we can't attend to the installations.

Q. Does Mercoid Corporation sell to the ultimate users directly?

A. No, it has no policy of selling the ultimate user. There might be an exception, but it would be an exception.

Q. Can you produce a copy of the Mercoid catalog for 1940?

A. Yes, sir.

Q. How many pages are there in that catalog?

A. I believe there are sixty pages in this catalog No. 400.

Q. Can you estimate about how many different types of controls are shown in that control?

A. Well, it would be a rough estimate, perhaps one hundred fifty. Of course, all these controls lend themselves to different specifications, which in our handling of them might lead us to say if you considered all the various
132 ranges it would run up to some thousands.

Q. I call your attention to the last page in the catalog. You have a patent notice, have you not, on that last page?

A. Yes, sir.

Q. How does it read?

A. (Reading) "Patent Notice. Mercoid controls are manufactured and sold under the following patents."

Q. About how many patents are listed under that?
A. Well, I should say there is one hundred or more.
Q. Now, under what authority does Mercoid manufacture its various controls under the patents that you have listed there?
A. Under the authority of a license agreement between the Mercoid Corporation and Mr. I. E. McCabe.
Q. I believe this license agreement has been referred to in the pleadings. Can you produce a copy of it?
A. Yes, sir.
(Handing document to the witness.)
Q. When was this agreement executed?
A. The 22nd day of September, 1921.
Mr. Freeman: Might I ask at this time, have there been any amendments or additions to that contract since September, 1921? If so, will you please produce them?
133 Mr. Moore: We will.
If it please your Honor, here is a book of the various letters admitted to be genuine and the contracts which we are going to refer to for your use. (Handing book to the court.)
Q. Between whom is this contract?
A. Between the Federal Gauge Company and Ira E. McCabe.
Q. Are you familiar with this agreement?
A. Yes, I am fairly familiar with it.
Q. And in that agreement what does McCabe agree to grant to the Federal Gauge?
A. He agrees to grant an exclusive right to manufacture—
Mr. Freeman: If your Honor please, the agreement itself specifies what is granted. This man should not be permitted to interpret what the agreement says in plain English.
Mr. Moore: Q. Will you please read Paragraph 2 of the agreement?
A. (Reading):
134 "McCabe further agrees to grant and does hereby grant unto Federal, its successors and assigns, exclusive license to manufacture, use and sell any additional designs of pressure, vacuum and thermostatic electrical control apparatus not mentioned in the preceding paragraph which he has developed or may develop during the life of this contract."

Q. Now, does McCabe agree to do anything further than grant a license?

A. Yes, sir.

Q. Referring to Paragraph 4.

A. (Reading):

"McCabe agrees further to supply Federal with such data, specifications and drawings as he may have or create pertaining to the apparatus specified in Paragraphs 1, 2 and 3 which they are to manufacture and sell and, with the assistance of Federal to establish the necessary specifications for production and manufacture of these devices."

Q. What does Federal agree to under this license, referring to Paragraph 8?

A. (Reading):

"Federal agrees to manufacture and sell and put forth every reasonable effort to market the inventions and designs of McCabe included in this agreement, and to manufacture them in accordance with specifications now devised by McCabe or such as shall thereafter be adopted by it with consent of McCabe through experimentation by it. To sell them and carry the sales accounts and a complete record of all lawful money or other matter or thing of value received by it for or on account of the sale thereof."

Q. Now, does Federal agree to do anything further, 135 referring to Paragraph 9?

A. (Reading):

"Federal further agrees not to manufacture, use or sell pressure, vacuum or thermostatic electrical control apparatus other than specified by McCabe unless by witten agreement with him."

Q. Do you know whether or not the controls illustrated in Mercoid Catalog No. 400 are all developed and patented by McCabe?

A. They are not all developed and patented by McCabe, but generally speaking they are, and in every case they are in there and merchandised in accordance with the agreement we have with him which gives him the approval.

Q. Are there any provisions in this contract in regard to litigation?

A. Yes, sir, there are.

Q. Referring to Paragraph 15.

A. (Reading):

"In case Federal, its assigns or any of its customers are sued in any court for infringement of letters patent by rea-

son of the use or sale of apparatus covered by this agreement, McCabe agrees to assist Federal in defending any and all such suits and to bear one-half the expense ensuing therefrom, unless such expense shall be covered by the agreement between the Arcless Contact Company and Federal, whereby the Arcless Contact Company agrees to
136 defray the expenses of Federal, in which case McCabe shall be free from such expense. McCabe further agrees to assist Federal in prosecuting any and all infringements of such patents as may be granted to him as heretofore specified in connection with this agreement and to bear half the expense, provided, however, such expense as may be incurred in any litigation involving patents shall not exceed the sum of fifty percent of all royalties paid by Federal to McCabe as such during a period of four (4) years following such litigation."

Q. Is that license agreement of 1921 between McCabe and the Federal still in existence?

A. It is, together with an amendment that I can produce.

Q. That is the amendment attached to the original pleading there?

A. That is correct.

Q. And when was that executed?

A. That was executed on the 9th day of April, 1932, between Ira E. McCabe and the Federal Gauge Company and The Mercoid Corporation.

Q. What is granted in that license agreement as specified in Paragraph 1?

A. (Reading):

"Federal, with the consent and approval of said McCabe, hereby exclusively licenses and empowers Mercoid to manu-
137 facture, use and sell electrical control apparatus, as specified in the contracts aforesaid, to the end of the term of said license from McCabe to Federal."

Q. Where did this license come from?

A. It came from the files of The Mercoid Corporation under my general custody.

Mr. Moore: Photostatic copies of the McCabe licenses, 1921 and 1932, are offered in evidence as MERCOID EXHIBIT P.

Mr. Freeman: We object to the offer at this time, unless we can have copies of any further amendments to the agreement and also a copy of the agreement with the Arcless Company referred to.

Mr. Moore: We will produce the agreement you ask for.

The Court: Very well. It may be received in evidence.

(The document was so marked.)

Mr. Moore: Q. Is Ira E. McCabe an officer of The Mercoid Corporation?

A. No, he is not.

Q. Is he an employee of the Mercoid Corporation?

A. No, sir.

Q. How does he conduct his business with The Mercoid Corporation, do you know?

A. Well, he has a group of development men under his supervision and under his expense structure, engaged
138 in the further development of devices.

Q. And he maintains this department at his own expense?

A. That is right.

Q. Now, to what extent, do you know, does Mr. McCabe carry out Paragraph 4 of this original agreement, whereby he agreed to supply Federal with such data, specifications and drawings as he may have or create pertaining to the apparatus specified in paragraphs numbered 1, 2 and 3?

A. He carries it out fully.

Q. Does he do that personally or is that through his development department?

A. It generally would be through his development department.

Q. About how many men does Mr. McCabe carry on his own expense as personnel in this development department at the present time, would you say?

A. About a dozen.

Q. And about how many men did he have in his development department when you became president of the company in 1938?

A. I think it was about the same number.

Q. Now, has Mr. McCabe carried out his agreement as expressed in Paragraph 15 of the original license,
139 whereby McCabe agrees to assist Federal in defending any and all suits against its customers for infringement of the letters patent by reason of the use or sale of apparatus covered by this agreement?

A. He has.

Q. You know this of your own personal knowledge, do you?

A. Yes, I do.

Q. What was the first occasion Mr. McCabe had to assist Federal, or its successor, Mercoid, in a suit brought against one of its customers for the sale of Mercoid apparatus?

A. That was the so-called Zoro case in which the Cleveland Trust Company of Cleveland sued one of our customers, Osher and Reiss, Brooklyn, New York.

Q. That suit was brought just before you came with the company, was it not?

A. That is correct.

Q. Do you know in what manner Mr. McCabe assisted Mercoid in defending certain customers?

A. Well, in addition to the provisions of the agreement, he also delegated one of his personnel to work with our counsel on the case.

Mr. Freeman: Your Honor, the line of examination is objected to. What difference does it make what Mr.
140 McCabe did with respect to some suit back East? If he has complied with this agreement, and this witness has so testified, that is all. He has paid half of the bill. As to the details of what he did, I can't see that has any bearing on this particular suit here involved.

Mr. Moore: Your Honor, this is the basis for the testimony of a gentleman that he has not named yet, who was detailed by Mr. McCabe to assist me in the various litigations.

Mr. Freeman: That still has nothing to do with this suit. If McCabe is paying for this suit, that's all right.

Mr. Moore: This man is going to give his testimony in this suit and I must lay a basis for his knowledge and ability.

Mr. Freeman: What difference does it make if a man was delegated for some other work? If he was delegated and is doing the work here, he can tell us about it.

The Court: I don't see the materiality. Of course, if this same gentleman comes on later and he is going to tell us about something, it might be desirable to have him tell us how he knows, but I think we are going rather far afield now.

Mr. Moore: May it please your Honor, may I ask
141 the witness the name of the individual?

The Witness: Mr. Frank Black.

Mr. Moore: Mr. Frank Black is going to testify he has had authority of The Mercoid Corporation to inspect its records. Here is the president. I am going to ask him if

he has that authority. That is about the only other question I want to ask him.

The Court: All right, ask him.

Mr. Moore: Q. You stated that was Mr. Black?

A. Mr. Frank R. Black.

Q. How does Mr. Frank R. Black work with The Mercoid Corporation in assisting counsel in patent litigation?

A. We give him complete access to all of our files for his searching.

Q. Now, referring again to the catalog of 1940, does this catalog illustrate and describe a combination furnace fan control?

A. Yes, sir.

Q. On what page?

A. On page 19.

Q. Can you produce one of these instruments?

A. Yes.

(Handing instrument to the witness.)

Q. How is that instrument identified?

142 A. It is identified as M-80.

Q. Does it have a name plate?

A. Yes, sir.

Q. Are there any patent numbers on that name plate?

A. There are patent numbers on the name plate.

Q. Will you please read them?

A. Patent Nos. 1,834,288; 1,991,350; 1,949,915; and 2,018,310.

Q. Do you illustrate in this catalog an individual furnace limit control?

A. Yes, sir.

Q. And on what page?

A. That is illustrated on page 18.

Q. And how is it identified?

A. It is identified as type M-51 Mercoid Warm Air Limit Control.

Q. Can you produce one of those instruments?

A. Yes.

(Handing instrument to the witness.)

Q. Does it bear a name plate?

A. It does, M-51.

Q. Do you find any patent numbers on that name plate?

A. Yes, sir; 1,752,957; 1,834,288; 1,949,915; and 2,018,310.

143 Q. Does the catalog also illustrate a furnace fan control?

A. Yes, sir.
Q. On what page?
A. On page 18.
Q. How is it identified?
A. Type M-53 SW Mercoid Warm Air Fan Control.
Q. And can you produce one of those instruments?
A. Yes, sir.
(Handing instrument to the witness.)
Q. Does that have a name plate?
A. Yes, sir.
Q. Do you find any patent numbers on it?
A. Yes, sir; patent Nos. 1,752,957; 1,834,288; 1,757,436; 2,018,310.
Q. Where did these controls that you have produced come from?
A. They came from our general stock.
Mr. Moore: Photostats of the title page and pages 18, 19 and 60 of Mercoid Catalog No. 400 of 1940 are offered in evidence as Mercoid Exhibit Q.
(The document was so marked.)
Mr. Moore: Q. Page 60 is the one that you referred to bearing the patent notice, is it not?
A. Yes, sir.
144 Q. I call your attention to the Mercoid installation instruction sheet dated November, 1940, and ask you what that is?
A. That is an instruction sheet entitled "Installation Instruction Mercoid Warm Air Furnace Controls, Types M-51, M-52, M-53, M-53SW, M-55, M-56, M-57, M-57SW."
Q. You have produced an M-51 and M-53 instrument. Can you produce also the M-52 referred to?
A. Yes, sir.
(Handing instrument to the witness.)
Q. Does that have a name plate on it?
A. It does.
Q. Are there any patent numbers on that?
A. There are patent Nos. 1,752,957; 1,834,288; 1,757,436; and 2,018,310.
Q. Where did this instruction sheet come from?
A. It came from our general files under my custody.
Mr. Moore: Photostatic copy of Mercoid Installation Instruction Form P-55A, dated November, 1940, is offered in evidence as MERCOID EXHIBIT R.
Mr. Freeman: Mr. Moore, will you tell us the difference

between M H Exhibit 1-B, Form P-55A, and the one you have offered? In other words, we already have one in.

Are they the same or are they different? The publi-
145 cation dates are different, but they both bear Form P-55A.

Mr. Moore: What is the date on that one?

Mr. Freeman: One dated November, 1940, and the other dated February, 1940. I just want to keep from duplicating exhibits, or at least not cluttering up the record any more than necessary.

Mr. Moore: Well, there is a slight difference in the illustration, and I couldn't answer that question offhand without comparing them microscopically.

Mr. Freeman: Let us add to your designation of P-55A "Published November, 1940."

Mr. Moore: I did. Form P-55A, dated November, 1940.

(The document was so marked.)

Mr. Moore: Q. Mr. Courteol, when you became president of Mercoid in 1938, did The Mercoid Corporation have a price list for manufacturers giving the net price of your M-80 combination furnace fan control?

A. Yes, sir.

Q. I show you here a manufacturer's purchase contract and ask you if that is what you refer to?

(Handing document to the witness.)

A. That is correct.

Q. And what is the date of that publication or agreement?

A. 1938.

146 Q. What is the minimum price of the M-80?

A. Seven dollars.

Q. And who is that price made to?

A. Herco Oil Burner Corporation, Lancaster, Pa., Pennsylvania.

Q. Then, this manufacturer's purchase contract is made with each of the manufacturers, is that correct?

A. That is correct.

Q. Can you produce a similar manufacturer's purchase contract for the year 1939?

A. Yes, sir.

(Handing document to the witness.)

Q. What is the minimum price for the M-80 combination control for the year 1939?

A. Five dollars and thirty-five cents.

Q. Can you produce a similar contract for the year 1940?

A. Yes, sir.

Q. What is the minimum price for the M-80 in the year 1940?

A. Four dollars and seventy-five cents.

Mr. Moore: Photostats of the price list are offered in evidence as MERCOID EXHIBITS R-1, R-2 and R-3.

(The documents were so marked.)

Mr. Moore: Q. I believe you stated that Detroit
147 Lubricator Company was a distributor of The Mercoid Corporation, is that correct?

A. That is correct. They are also a manufacturer.

Q. Do you know whether or not Detroit Lubricator Company publishes manufacturer's price lists?

A. Yes, they do.

Q. How do you know that?

A. We maintain files of such material as we can secure and we have secured such schedules from the Detroit Lubricator Company.

Q. Can you produce a manufacturer's price sheet of the Detroit Lubricator Company for the year 1939?

A. Yes, sir.

Mr. Freeman: That is objected to. I can't see where a price list put out by some other company that is not either party to this suit or in any way connected with this suit is material.

Mr. Moore: It will be connected in this suit during the testimony, your Honor.

Mr. Freeman: We might get some of the connection. I don't want to be constantly making objections.

The Court: What is the materiality?

Mr. Moore: Your Honor, the supplemental complaint
148 charges Minneapolis did not try to enforce this patent against Mercoid until after Mercoid had cut its price below that mentioned in the license. The evidence will also show that a similar license was offered to the Detroit Lubricator Company, and the Detroit Lubricator Company failed to take the license. Now, this 1939 and 1941 price list will show during those years Detroit Lubricator Company was maintaining the price as set forth in the license.

The Court: Well, go ahead.

Mr. Moore: Q. Did you give the price of the Detroit

Lubricator Company for the combination fan furnace control?

A. Five dollars and twenty-five cents.

Q. You have already identified where this came from?

A. Yes, sir.

Mr. Moore: A photostat of the Detroit Lubricator Company's manufacturer's price sheet dated January 20, 1939, is offered in evidence as MERCOID EXHIBIT K-1.

Mr. Freeman: That is objected to as showing anything as of January 20, 1939. This witness might testify when this came into his possession, but—

Mr. Moore: I merely introduced it as being dated January 20, 1939, which date appears upon the paper.

The Court: What is it?

149 Mr. Freeman: It is one of these Detroit Lubricator price lists.

Mr. Moore: And it is dated, your Honor, right here; when they put it out.

Mr. Freeman: You are putting it in to show the price this company sold these items. If this witness wants to testify as to when he received this, that is another story.

The Court: I think that objection is well taken. It does not prove itself.

Mr. Moore: I am not attempting to prove they sold them, but merely they are offering them for sale at that price. The witness has said this come into his possession, as given to him by the Detroit Lubricator Company in the course of business.

The Court: When?

Mr. Moore: Q. When did you receive this, do you remember?

A. I will have to consult our records on that.

Q. Was it just recently?

A. Well, those come in from time to time as they are issued by the Detroit Lubricator Company. I can't give you a definite date on which that arrived at our office.

Q. Was it this year?

150 A. That particular price schedule might have come into our office any time subsequent to January 20, 1939.

Mr. Freeman: That is mere speculation.

The Court: I suggest at some recess, or at some interval when court is not in session, that you find out about when that paper was issued, or when it came into the witness' possession, and advise counsel what you find out. If you

have some ideas about it, maybe you can agree about dates or something of that kind. What the materiality of that is eventually, I don't know. Matters of that kind are easier to prove after you get the right man to do it. Sometimes it is difficult to do it. Maybe you can obviate that if you find out your date and take it up with counsel. It does not prove itself. That is evident. Even if this gentleman said, "I received it on a certain date," it would not prove anything else but on that date he received that yellow piece of paper, on or about that date. That is all it would prove.

Mr. Moore: May this be received in evidence subject to the further examination of the witness as to when he received it?

Mr. Freeman: I think your Honor has already ruled.

The Court: I don't think there is any basis for re-
151 ceiving it now. Mark it for identification.

Mr. Moore: I was going to ask that it be marked for identification.

The Court: Mark it for identification without any further proof or make some agreement in respect to it.

Mr. Moore: I ask that it be marked for identification as Mercoid Exhibit K-1.

(The document was so marked.)

Mr. Moore: Q. Can you produce another manufacturer's price list of the Detroit Lubricator Company?

Mr. Freeman: The same objection.

Mr. Moore: For January, 1941. And I will ask that be marked for identification also.

The Court: All right. Produce it and have it marked.

Mr. Moore: This particular manufacturer's price sheet was also referred to in cetain of the depositions taken, and at that time was offered as Exhibit K, and was objected to as not being properly proven. I will ask to have this marked for identification as Exhibit K.

The Court: Very well.

(The document was so marked.)

Mr. Moore: Q. Now, Mr. Courteol, when did you first hear of this Freeman patent in suit?

A. The latter part of 1939, the early part of 1940.

152 Q. What was the occasion of bringing up this Freeman patent, do you remember?

A. It was at a conference at the Blackstone Hotel in Chicago that I met Mr. Willard Huff, vice president and

treasurer of the Minneapolis-Honeywell Regulator Company. The meeting was called for other matters, but at its close he asked me to remain over and brought up the question of the Freeman patent, stated that the Minneapolis-Honeywell Company wanted us to consider immediately a license thereunder, submitted a proposed license form and requested I take it up with our people and let them know our disposition.

Q. When this question of taking a license from Minneapolis-Honeywell first arose, did you make or cause to be made a search of the Mercoid records to find out whether or not Minneapolis-Honeywell had ever raised this question before with The Mercoid Corporation?

A. Yes, sir.

Q. I show you here a letter dated November 28, 1932, and ask you if you know what that is?

(Handing document to the witness.)

A. That is a letter from the Minneapolis-Honeywell Regulator Company, dated November 28, 1932, to The Mercoid Corporation, 4201 Belmont Avenue, Chicago, Illi-
153 nois, attention Mr. L. H. VanNess.

Q. Will you please read that first paragraph?

A. (Reading):

"At a meeting sometime ago between Mr. VanNess, Mr. Reed and myself, it was understood that I was to advise you of certain patents owned or controlled by our company which are being infringed by some of the devices that we understand you are building. Therefore, I want to call your attention to these patents and ask you to investigate them and later talk the situation over."

Q. Now, will you please read the first paragraph on page 2?

A. (Reading):

"In reference to your furnace fan circuits, we would call your attention to the Freeman Patent No. 1,813,732."

Mr. Moore: A photostat of the letter from Minneapolis-Honeywell Regulator Company to The Mercoid Corporation, dated November 28, 1932, is offered in evidence as MERCOID EXHIBIT S, and it might be said that this letter and other letters from the Minneapolis-Honeywell Regulator Company have been admitted to be genuine under Rule 36.

The Court: Very well.

(The document was so marked.)

154 Q. This morning when I asked you if you could produce these manufacturers' purchase price contracts which have been introduced by the Mercoid Corporation or which were introduced as Mercoid exhibits R-1, R-2 and R-3, I did not ask you where they came from. Do you
155 know where they came from?

A. They came from our files in my general custody.

Q. Can you produce a catalog of the Minneapolis-Honeywell Regulator Company for the year 1940?

A. Yes, sir.

Q. Where did this catalog come from?

A. It came from our files under my general custody.

Mr. Freeman: If that is a Minneapolis-Honeywell catalog, we will concede we put it out.

Mr. Moore: All right.

Q. I call your attention to page 40 of that catalog and ask you what that shows at the top.

A. Patent notice.

Q. What does it state directly below the patent notice?

A. "Minneapolis-Honeywell Controls, Time-O-Stat Controls and Con-Tac-Tor Mercury Switches and National Regulator Controls are manufactured and sold under the following patents either owned by Minneapolis-Honeywell Regulator Company or under which Minneapolis-Honeywell Regulator Company is licensed. Other U. S. and foreign patents are pending."

Q. Have you counted the number of patents that are shown below that notice?

A. I have estimated them at six or seven hundred.

156 Q. I notice that the number of the patent in suit, 1,813,732, is included in that list with an asterisk behind it and below the list of patents there is an explanation of the asterisk. Will you please read that explanation?

A. "The right to use the systems protected by the following patents is only granted to the user by Minneapolis-Honeywell Regulator Company when the particular controls as shown below are purchased from Minneapolis-Honeywell Regulator Company and used in the systems."

Q. Now, there are a number of patents listed below that explanation. What is the last one in the last row?

A. 1,813,732, forced air furnace control system, furnace fan controls.

Q. What is the third above that, the second one in the list?

A. 1,758,146, system of maintaining stoker fire.

Q. That is the patent involved in the suit referred to this morning, is it not?

A. Yes, sir.

Mr. Moore: Photostat of the outside cover and page 40 of the Minneapolis-Honeywell catalog of 1940 are offered in evidence as MERCOID EXHIBIT T.

157 (The cover and page were so marked.)

Mr. Moore: Q. I show you here certain bulletins, catalogs and instruction sheets put out by Federal Gauge and Mercoid Corporation and ask you if you can identify them as being put out by the Federal Gauge or the Mercoid Corporation.

A. Yes, I can so identify this bulletin D, Federal-Mercoid Controls.

Q. Dated when?

A. April 1, 1924.

Mr. Moore: This bulletin just referred to is asked to be marked for identification MERCOID EXHIBIT U.

(The bulletin was marked as requested.)

The Witness: I identify this as Mercoid Bulletin E, Federal-Mercoid Thermostats, date June, 1924.

Mr. Moore: Bulletin E of June, 1924, is asked to be marked for identification MERCOID EXHIBIT V.

(The bulletin was marked as requested.)

The Witness: I identify this as Mercoid Bulletin E-3, Federal-Mercoid Controls, date April, 1926.

Mr. Moore: This Bulletin E-3 of April, 1926, is asked to be marked for identification MERCOID EXHIBIT W.

(The bulletin was marked as requested.)

The Witness: I identify this as Mercoid Catalog 158 No. H-3, date 1928.

Mr. Moore: This catalog is asked to be marked for identification as MERCOID EXHIBIT X.

(The catalog was so marked.)

Mr. Moore: Q. I show you here another catalog and ask you to identify that.

A. I identify this as Mercoid Catalog No. H-5, published in 1929.

Mr. Moore: This catalog of 1929 is asked to be marked for identification as MERCOID EXHIBIT Y.

(The catalog was so marked.)

The Witness: I identify this as Bulletin No. S-83, Mercoid Warm Air Furnace Controls M-51, M-52, M-53.

Mr. Moore: This Bulletin S-83 is asked to be marked MERCOID EXHIBIT Z.

(The bulletin was so marked.)

The Witness: I identify this as Mercoid Bulletin No. A-5, Mercoid M-53, Warm Air Furnace Fan Control.

Mr. Moore: This bulletin is asked to be marked for identification as MERCOID EXHIBIT AA.

(The bulletin was so marked.)

The Witness: I identify this as Bulletin A-14, Mercoid Automatic Controls for Stokers and Forced Draft Coal Burning Equipment.

159 Mr. Moore: This bulletin is asked to be marked for identification as MERCOID EXHIBIT BB.

(The bulletin was so marked.)

Mr. Moore: Q. Do you know where these various bulletins and catalogs you have identified came from?

A. They came from the Mercoid files under my general custody.

Q. But they were issued before you became president?

A. That is correct.

Mr. Moore: Do you care, Mr. Freeman, to admit these as having been issued by the Mercoid Corporation or Federal Gauge, or I can produce another witness to identify them. They are simply marked for identification at the present time.

Mr. Freeman: Why don't you ask him whether or not they still keep these catalogs and put them out in the regular course of business, so as to comply with the statute which might make this admissible?

Mr. Moore: Well, I will identify them properly by proper witnesses.

There are three more here, Mr. Courteol.

The Witness: I identify this as a bulletin of the Mercoid combination fan and limit control for warm air furnaces, Bulletin M-12.

160 Mr. Moore: Bulletin M-12 is asked to be marked for identification as MERCOID EXHIBIT CC.

(The bulletin was so marked.)

The Witness: I identify this as Mercoid Bulletin E-2, Federal-Mercoid Thermostats, December, 1923.

Mr. Moore: This bulletin is asked to be marked for identification MERCOID EXHIBIT DD.

(The bulletin was so marked.)

The Witness: I identify this as installation instructions,

Mercoid warm air furnace controls, M-51, M-52, M-53, M-55, M-56 and M-57, No. P-55.

Mr. Moore: Q. What date?

A. September, 1934.

Mr. Moore: I ask this Bulletin P-55 of September, 1934, be marked for identification MERCOID EXHIBIT EE.

(The bulletin was so marked.)

Mr. Moore: Q. I call your attention to a publication entitled Fuel Oil of July, 1929, and ask you what you find on pages 80 and 82?

A. On page 80 is an article covering new equipment and literature and in the body of it it says:

"The Mercoid Corporation, 564 West Adams Street, Chicago, Illinois, has just announced a new warm air furnace control for use on furnaces equipped with booster fans. This control, which employs the new type of
161 tipless Mercoid switch, is independently mounted and is actuated by a thermostatic metal coil. The purpose of the control is to act as a limiting device in connection with automatic oil burning equipment to prevent overheating of the warm air furnace. In addition it functions as a booster fan control to start the furnace fan motor when the furnace hood temperature has reached a predetermined degree, and stop the fan motor when the hood temperature drops. In other words, when the oil burner is supplying heat the fan is automatically but independently started and operates as long as the burner is on."

Q. What is this publication of Fuel Oil?

A. The Fuel Oil Journal is a trade publication or periodical that has been published for the oil heating field for a number of years.

Q. Do you know where that particular copy came from?

A. Yes, that came from the files of the Mercoid Corporation under my general custody.

Mr. Moore: Photostats of pages 80 and 82 of the Fuel Oil Journal of July, 1929, are offered in evidence as MERCOID EXHIBIT FF.

(The photostats were so marked.)

Mr. Moore: Q. Mr. Courteol, who are the vice presidents of the Mercoid Corporation at the present time?

A. Mr. J. W. Owens, Mr. A. N. Schultz, and Mr. R. F. Fisher.

162 Q. What are the particular duties, if any, of Mr. Owens, who is vice president?

A. He is in general charge of our sales.

Q. How long has he been in charge of sales, do you know?

A. Since the inception of the Federal Gauge Company.

Mr. Freeman: Just how does this witness know that? If you are going to put Mr. Owens on and he testifies that he has been in charge of sales since the inception of the company, that is all right, but this witness does not know.

Mr. Moore: Q. He has been in charge of sales since you became president, has he not?

A. That is correct.

Q. Now, referring to this conference you spoke about with Mr. Huff, at which time the Freeman patent was first mentioned, I believe that was in December of 1939 or the first part of January, was it not?

A. That is correct.

Q. Did you have any further correspondence or conferences with Mr. Huff just following the one you have just referred to?

A. Yes, sir.

Q. And what did that consist of?

163 A. We had a letter from the Minneapolis-Honeywell Regulator Company of date January 24, 1940, addressed to Mr. Courteol, the Mercoid Corporation, reading as follows:

"Will you please tell me whether or not you and Mr. McCabe have had an opportunity to give consideration to the matter of licensing under the Freeman patent along the lines which I discussed with you in Chicago last week?

"Very truly yours,

Minneapolis-Honeywell Regulator Company,

W. L. Huff,

Vice President and Treasurer."

Mr. Moore: Photostat of this letter of January 24, 1940, from Minneapolis-Honeywell Regulator Company to Mr. Courteol, The Mercoid Corporation, is offered in evidence as MERCOID EXHIBIT GG.

(The photostat of letter was so marked.)

Mr. Moore: This is one of the letters Minneapolis-Honeywell have admitted to be genuine.

Mr. Bair: That letter was read in its entirety. The offer of the exhibit is objected to for the reason the subject of the letter is entirely in the record already and this offer

merely means we have the letter in the record twice.

164 The Court: Well, it may be received when you make up the record. It may be incorporated then.

Mr. Moore: Q. Did you receive a copy of a license as proposed by Minneapolis-Honeywell to Mercoid to which this letter refers, under the Freeman patent?

A. Yes, sir.

Q. That is a typewritten copy, is it not?

A. Yes, sir.

Q. And where did that come from?

A. That came from our general files, under my custody.

Q. And it has attached at the back of the license proper, hasn't it, a price schedule, Exhibit A?

A. Yes, sir.

Q. And that was part of the typewritten license?

A. Yes, sir.

Q. When it was submitted to you?

A. Yes, sir.

Mr. Moore: A photostat of this license submitted to Mercoid Corporation by Minneapolis-Honeywell under the Freeman patent in suit is offered in evidence as MERCOID EXHIBIT HH.

(The photostat of license was so marked.)

Mr. Moore: Q. Was there any other form of license submitted to you besides that one in typewritten form?

165 A. Yes. There later was a printed form offered.

Q. I show you here a printed form of license and ask you if that is the one that was received by you from the Minneapolis-Honeywell Corporation?

A. Yes, sir.

Q. Have you any documentary proof or evidence that that printed form was submitted to you?

A. Yes, sir. I have a letter from Minneapolis-Honeywell Regulator Company dated May 7, 1940, addressed to Mr. C. J. Swan, Detroit Lubricator Company, Detroit, Michigan, and Mr. Ira E. McCabe, Mercoid Corporation, Chicago, Illinois, reading as follows:

"In connection with the printed form of licensing agreement which I handed to you in Chicago last week I should at the same time have furnished you with copies of the attached letters, both of which have become a part of this agreement in the cases where licenses have been granted

and these same conditions would apply in connection with any new licenses issued.

"Very truly yours,
Minneapolis-Honeywell Regulator Company,
W. L. Huff,
Vice President and Treasurer."

Q. There were copies attached, were there?

A. Yes, sir.

Q. Please read the first one?

166 Mr. Bair: If that is going to be offered in evidence we object to it, on the ground there is no use of introducing it twice.

Mr. Moore: There are just two sentences there that—

The Court: If he is going to offer it, he can read it.

Mr. Moore: All right.

The Witness: "With reference to license agreement this day entered into—"

The Court: Counsel, if you have the witness read a paper, that is copied in the transcript, and that takes two or three pages, and then you offer the exhibit and that goes into the record too, and that makes expense. Now, if you are going to offer it, offer it in evidence and then you can read it to him. You can read it to me.

Mr. Moore: All right.

Q. First, where did you get this letter?

A. This letter came from the Mercoid files, under my custody.

The Court: I realize that won't be pleasing to the reporter.

Mr. Moore: A photostat of the letter of May 7th—

The Court: It ought to be in the record. Show it is in evidence and then read it. If you make a record of it, 167 then you are putting it in twice. Do you get the point?

Mr. Moore: Yes, your Honor. I merely want to get certain parts of these letters into the record.

The Court: All right. You offer that exhibit.

Mr. Moore: Then I will read the part I want and ask him if he finds that in there.

The Court: If it is in there?

Mr. Moore: Yes.

The Court: Whether he finds it or not, if it is in there, it is in there.

Mr. Moore: I offer a photostat of the letter of May 7, 1940, from Minneapolis-Honeywell addressed to C. J. Swan

and to Mr. Ira E. McCabe, and the two letters attached thereto as MERCOID EXHIBIT II.

(The letters were so marked.)

Mr. Moore: I desire to call the court's attention to the second letter attached, which reads as follows: (reading).

Mr. Bair: Now, if the court please, I understand this matter that Mr. Moore has just read to the court is for the court's information, so the court may keep currently advised of what is going on and it is not to be included as a part of the stenographic notes.

168 The Court: No. You offer the exhibit and then you say, "I desire to read this" and then the reporter says "reading," and that is all the record shows, and then the exhibit is in once and you don't build up the record. It is needless.

Mr. Moore: Q. I notice this letter of May 7, 1940, is addressed to Mr. Ira E. McCabe, the Mercoid Corporation. How is it that the license is submitted to Mr. McCabe and not to the Mercoid Corporation?

A. That would not be unusual, because Mr. McCabe has been around the control industry for a great many years and I think it is quite natural if some one wanted to take up a matter with the Mercoid Corporation they might write Mr. McCabe, because he has been very intimately associated with the industry and is known to most of the principals throughout the industry.

Q. Now, you said that this letter came from the records of the Mercoid Corporation, whereas it is addressed to Mr. McCabe. How did it become a part of your records?

A. After he received it and read it he would turn it over to the Mercoid Corporation.

Mr. Moore: I offer the printed copy of the license agreement just referred to as MERCOID EXHIBIT JJ.

(The copy of agreement was so marked.)

169 Mr. Moore: Q. Have you compared the typewritten copy with the printed copy that was later submitted to you by the Minneapolis-Honeywell Regulator Company?

A. Yes, I have.

Q. Are they identical?

A. No. There have been certain additions made to the printed copy and the printed copy does not have the price schedule appended.

Q. Were those differences material?

A. I don't think they were material.

Mr. Bair: That is objected to.

The Court: Sustained. It calls for a conclusion.

Mr. Moore: Q. What was the biggest change made?

The Court: That calls for another conclusion.

Mr. Bair: We object to that, because—

The Court: That is the same as saying one paper is yellow and the other one is green, and he might be telling the truth about it. Here is a case where if there is some difference in materiality I don't see how you can avoid putting them both in and then you can talk about them now or later on.

Mr. Moore: Q. Both the typewritten and printed copies of this license have a clause marked "Definition," have they not?

170 A. That is correct.

Q. Was there anything added to the definition in the printed copy? If so, please read it.

A. "It being understood—"

Mr. Bair: We ask that that be left to the documents themselves.

The Court: If you think there is a material difference, put it in, and then in argument you can call my attention to it. Do it right now, if you want to, but put it in. You do that.

Mr. Moore: That has been introduced in evidence, your Honor.

The Court: All right. You read it to me.

Mr. Moore: All right.

The Court: Just say, "I want to call your Honor's attention to so and so," and the reporter says, "Counsel read a portion of the exhibit."

Mr. Moore: I would like to call the court's attention to the last paragraph under the definition of combination furnace control on page 2 of the printed license, the last sentence beginning in the line fourth from the bottom. (Reading.)

The Court: Let me see that.

Mr. Moore: This is the only copy I have.

171 The Court: Where were you reading?

Mr. Moore: Page 2, under the definition.

The Court: All right.

Mr. Moore: Q. The part I just quoted does not appear in the typewritten copy, is that correct?

A. No, sir.

Q. In the pleadings Minneapolis-Honeywell has furnished a typewritten license granted the Cook Electric Company, a photostat of which I show you and ask you if you have read this license granted to the Cook Electric Company on March 31, 1939.

A. Yes, sir.

Q. Have you compared it with the typewritten license submitted to the Mercoid Corporation, Mercoid Exhibit HH?

A. Yes, sir.

Q. How do they compare?

A. They are the same.

Q. Is there any price schedule attached to the photostatic copy of the Cook license handed to you?

A. There is not. There is that difference between the two.

Q. Later during the pleadings Minneapolis-Honeywell furnished a price schedule, Exhibit A, which was supposed to be attached to all of its licenses. I show you a
172 photostatic copy of this price schedule, Exhibit A, and ask you if you have read that.

A. Yes, sir.

Q. Now, have you compared that with the price schedule, Exhibit A, attached to the license submitted to the Mercoid Corporation?

A. Yes, sir.

Q. How do they compare?

A. They are the same.

Mr. Moore: A photostatic copy of the license between Minneapolis-Honeywell Regulator Company and Cook Electric Company, dated March 31, 1939, is offered as MERCOID EXHIBIT KK and a photostatic copy of the price schedule Exhibit A is offered in evidence as MERCOID EXHIBIT LL.

(The documents were so marked.)

Mr. Moore: Q. Now, referring to the license proposed to Minneapolis-Honeywell—

Mr. Freeman: To Mercoid, you mean.

Mr. Moore: Yes.

Q. Referring to the license proposed by Minneapolis-Honeywell to Mercoid, marked Exhibit HH, this license sets up the ownership by Minneapolis-Honeywell of the patent in suit, does it not?

A. Yes, sir.

173 Q. What does this license propose to grant to Mercoid?

Mr. Bair: That is objected to.

The Court: Sustained.

Mr. Bair: It speaks for itself.

The Court: Yes, it speaks for itself.

Mr. Moore: I wish to call the court's attention to paragraph 2 under the heading of "Grant." (Reading.)

I also desire to call the court's attention to paragraph 3 under the heading of "Royalties" appearing on page 2 of this license. (Reading.)

There is also a section entitled "Price Condition," Section 7, beginning on page 5 of this license. I would like to call the court's attention to paragraph A. (Reading.)

I also desire to call the court's attention to the price schedule A under the list for manufacturers' prices, item No. 3. "The net minimum price for a combination furnace control operable at two speeds shall be $7.50."

Q. I ask the witness, as he has read both the license and the schedule, is there any place in the license proper which refers to the use of the combination furnace control operable at two speeds?

A. No, sir.

174 The Court: Is there what?

Mr. Moore: Is there any mention or reference in the license proper to the sale of a combination furnace control operable at two speeds.

Q. Does the Mercoid Corporation sell controls which can be adopted to be used in a heating system in which there is a two-speed control?

A. Yes, sir.

Q. Do you know of any patents upon a system in which two-speed fan control forms part?

A. Yes.

Q. Can you produce one of them?

A. Yes, sir. This is patent No. 2,230,446, J. S. Baker, dated February 4, 1941, automatic control system for warm air furnaces.

Mr. Moore: A copy of this Baker patent is offered in evidence as MERCOID EXHIBIT L.

(The copy of patent was so marked.)

Mr. Moore: It might be stated that this patent was also offered in evidence during the depositions under that letter and at that time was objected to.

Mr. Freeman: We renew that objection. The date the patent was filed is July 16, 1934, long after the issuance of the Freeman patent, and as to whether additional pat-
175 ents were issued is immaterial. This patent happens to be directed to a two-speed fan control, whereas the Freeman patent does not say anything about one-speed, two-speed or three-speed. The objection is that it is immaterial.

Mr. Moore: But the license requires a charge for a two-speed operation. Mr. Freeman just said that the Freeman patent did not have a two-speed operation.

Mr. Freeman: I did not say it did not cover a two-speed operation. You have the same sequence of operation whether the fan works at 1500 r.p.m. or whether it works at 1800 r.p.m. Baker may have made some additional improvements. That still does not mean that a structure made in accordance with the Baker patent with the fan operating at two speeds is not a full embodiment of the Freeman patent, and if this witness were asked now does the single speed device and the two-speed device have the same sequence of operation I think Mr. Courteol would say they are the same.

Mr. Moore: May it please your Honor, this ties up with this patent in suit, because the license requires a certain $7.50 charge for a combination control with two speed oper-
ation and this patent shows that, and in the Patent
176 Office there was an interference between this patent and one of Minneapolis-Honeywell's. They exchanged licenses to settle that, and in that settlement it states definitely that in the settlement or exchange of licenses Minneapolis-Honeywell is not given any right to license other licensees under this Freeman patent for two-speed operation. I would like to put those documents in evidence, your Honor, because the license charges a fee for a two-speed operation, yet the record shows they had no right to use it or license others to use it.

The Court: I will receive it.

Mr. Moore: The Baker patent is then introduced in evidence as MERCOID EXHIBIT L.

The Court: It may be received.

Mr. Moore: Q. How did this Baker patent come to your attention, Mr. Courteol?

Mr. Freeman: That is objected to as immaterial. It does not make any difference so far as this lawsuit is concerned how he found out about the Baker patent.

The Court: What is the materiality?

Mr. Moore: The owner of the Baker patent is a licensee under the Freeman patent and one year after the filing of this suit the owner of the Baker patent, a licensee, the
177 Cook Electric Company, threatened to sue Mercoid under the Baker patent.

Mr. Freeman: I might also add they threatened to sue Minneapolis-Honeywell too, the same one.

Mr. Moore: They could not, because they exchanged licenses; they could not sue.

Mr. Freeman: You still want to read that license that they gave us.

Mr. Moore: I would like to put the license in evidence.

Mr. Freeman: You want to read it before you make the statement you just made to the court.

Mr. Moore: The court can read it and make his own decision.

The Court: I cannot see what difference it makes how he heard about it. If you think it does, ask him.

Mr. Moore: He has produced a letter in regard to it.

The Witness: This is a letter from Thiess, Olson & Mecklenburger, addressed to Mercoid Corporation, attention Mr. Ira E. McCabe, stating as follows—

Mr. Moore: Never mind reading it.

Q. Where did that come from?

A. It came from the Mercoid files, under my general custody.

Mr. Moore: A photostat of this letter from Thiess,
178 Olson & Mecklenburger, dated July 1, 1941, addressed to the Mercoid Corporation, is offered in evidence as MERCOID EXHIBIT MM.

(The photostat of letter was so marked.)

Mr. Moore: I desire to call attention to the first part of this letter. It is addressed to The Mercoid Corporation, attention Mr. I. E. McCabe. (Reading.)

I also would like to call attention to the sentence beginning on page 2. (Reading.)

Mr. Freeman: We object to that, because it is absolutely immaterial. It has no bearing in connection with the Freeman patent.

The Court: I do not see its materiality.

Mr. Bair: What was that exhibit number?

Mr. Freeman: MM.

Mr. Moore: Did your Honor admit that?

The Court: Yes.

Mr. Moore: I also offer in evidence a certified copy, recorded in the United States Patent Office on May 22, 1939, in Liber K 179, page 323, of the license agreement entered into the 31st day of March, 1939, by and between Minneapolis-Honeywell Regulator Company and Cook Electric Company, which states—

Mr. Freeman: Is that likewise in respect to this 179 same Baker patent?

Mr. Moore: This is a statement here where—

Mr. Freeman: No, is the license directed to the same Baker patent owned by the Cook Electric?

Mr. Moore: It is directed to the same Baker patent owned by the Cook Electric Company.

Mr. Freeman: And we renew our objection, because we are going pretty far afield now.

The Court: I do not want to limit you, but for the life of me I do not see the materiality of this.

Mr. Moore: Your Honor, this is paragraph 7 of this license. You see, Minneapolis-Honeywell first licensed the Cook Electric Company under the Freeman patent.

The Court: Which license is this?

Mr. Moore: This is the license which was executed on the same day between Minneapolis-Honeywell and Cook Electric Company under another matter in settling an interference in the Patent Office involving the Baker patent.

Mr. Freeman: But not the Freeman patent.

Mr. Moore: This refers to the Freeman patent in this part that I would like to call the court's attention to. Now here on the same day that Cook took a license from Minneapolis-Honeywell under the Freeman patent, Cook 180 granted a license under the Baker patent.

The Court: Yes.

Mr. Moore: And it states here that it does not include any right to the latter company to grant sub-licenses to its other licensees under the Freeman patent on two-speed operation as covered by the Baker patent.

Now, in the price schedule which they offered The Mercoid Corporation on a combination furnace control there is not a word said in the license about any two-speed operation until it comes to the price schedule; then if Mercoid accepts that license, pays this $7.50 and puts the control on the market under the two-speed operation, it is not covered by the Freeman patent, because it is specifically stated

in this agreement between Cook and Minneapolis-Honeywell that the Freeman patent licensees shall not be given the right or license to use the furnace control two-speed operation as covered by the Baker patent.

Mr. Freeman: If the court please, Mercoid did not take this license. It was proposed to them. They had the right to take it. We are not being tried here for what Mr. Moore says may be some breach as between some party not here in court, one of our other licensees. If they have
181 any complaint they can register it.

The Court: My state of mind is this: For the life of me I do not see the materiality of it, yet I am anxious to get all of the evidence in, even to the extent of evidence that I cannot see the materiality of. I do not see the materiality of this, but you can put it in. Is there going to be a great dot of it?

Mr. Moore: Not very much, your Honor.

The Court: I do not see what that has got to do with this?

Mr. Moore: Mercoid has charged Minneapolis with bad faith in offering a license under a two-speed operation when they have already agreed that they have no authority to do it. That is the only use of this point.

The Court: Maybe they made something else, some other agreement.

Mr. Moore: That is what I want them to show.

Then you will accept this in evidence?

The Court: Yes.

Mr. Moore: Certified copy of the license between Minneapolis-Honeywell and Cook Electric Company of March 31, 1939, recorded in the Patent Office in Liber K 179, page 323, is offered in evidence as MERCOID EXHIBIT N.
182 (The document was so marked.)

Mr. Moore: I also would like to offer in evidence a certified copy of the concession of priority in that interference in which the parties agreed to concede the priority to the party Baker.

Mr. Freeman: We make the same objection.

The Court: Objection overruled. It may be received.

(The document was so marked.)

Mr. Moore: And a certified copy of this interference, concession of priority, Interference No. 73,148 is offered in evidence as MERCOID EXHIBIT OO.

(The document was so marked.)

Mr. Moore: Q. Following the letter of May 7, 1940, from Minneapolis-Honeywell did you have any further correspondence in regard to this Freeman patent?

A. Yes, sir.

Q. What have you got there in your hand?

A. We received a letter from the Minneapolis-Honeywell Regulator Company, date June 21, 1940, addressed to Ira E. McCabe, the Mercoid Corporation, reading as follows,—

Q. Never mind reading it. Where did that letter come from?

A. It came from the Mercoid files under my general
183 custody.

Mr. Moore: Photostatic copy of this letter of June 21, 1940, which has also been admitted to be genuine by the Minneapolis-Honeywell Company—

Mr. Freeman: We do not question any letters that we wrote.

Mr. Moore: (Continuing) —is offered in evidence as EXHIBIT QQ.

(Photostatic copy of letter was so marked.)

Mr. Moore: I merely call the court's attention to the statement in this letter: "In view of your failure to reach a decision in the matter we have no choice but to enter suit and this we expect to do on July 1st."

Q. Did you make any reply to that letter?

A. Yes, sir.

Q. What is that you have in your hand?

A. A letter of June 28, 1940, addressed to Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota, reading as follows—

Q. Who is it addressed to?

A. It is addressed to the attention of Mr. L. W. Huff, vice president and treasurer.

Q. And how is it signed?

A. Signed by Hugh Courteol, president of the Mer-
184 coid Corporation.

Q. That is a carbon copy you have in your hand?

A. That is correct.

Q. Did you write and sign the original?

A. Yes, sir.

Q. And where did this carbon copy come from?

A. From our general files, under my custody.

Mr. Moore: A photostat of this letter referred to by

Mr. Courteol as having been written to Mr. Huff on June 28, 1940, is offered in evidence as MERCOID EXHIBIT RR.

(The photostat of letter was so marked.)

Mr. Moore: I merely call the court's attention to the fact that this letter denies the infringement. The last paragraph reads (reading):

These letters are put in, your Honor, because this is a suit for a declaratory decree and there must be an actual controversy shown before the court assumes jurisdiction.

Mr. Freeman: We will concede there is a controversy.

Mr. Moore: Q. Now, was there anything further received from Minneapolis-Honeywell in regard to this proposed license? I am calling particular attention to the sheets which were attached to the letter of May 7th, which was received by the Mercoid Corporation after the 185 infringement suit had been instituted.

A. Yes, there was another letter.

Q. Can you produce it?

A. I can. It is a letter from Minneapolis-Honeywell Regulator Company dated October 7, 1940, addressed to Mr. Ira E. McCabe, the Mercoid Corporation, reading as follows—

Q. Never mind reading that. That was received by the Mercoid Corporation?

A. That is correct.

Q. And where did it come from?

A. It came from the Mercoid files, under my general custody.

Mr. Moore: A photostatic copy of this letter of October 7, 1940, from the Minneapolis-Honeywell Regulator Company to Mr. Ira E. McCabe is offered in evidence as MERCOID EXHIBIT SS.

(The photostat of letter was so marked.)

Mr. Moore: I desire to call the court's attention to the fact that this letter refers to Mr. Huff's letter of May 7th, in which he attached two additional paragraphs to be made a part of the various licenses, and I call the court's attention to the second one in relation to fixing a price of 25 per cent higher than the price mentioned in the schedule for the price schedule. Now, Mr. Huff writes: (read-
186 ing).

Q. Minneapolis-Honeywell in its pleadings has stated that it has granted licenses under this Freeman

patent to the Cook Electric Company. Are you acquainted with the Cook Electric Company?

A. Yes, I am.

Q. Do you know anything about it?

A. They are a very old company in electrical manufacturing. In recent years I believe they have manufactured and sold some controls such as we also build. They are not what we would regard as a very large competitor. We scarcely think of them as such.

Q. When you came with the Mercoid Corporation as president in 1938 did you consider the Cook Electric Company at that time as a competitor?

A. No, I should not say that. We did not consider them a real competitor.

Q. A license was also granted to the Penn Electric Switch Company. Is that an old company?

A. That is a company that I believe started in 1928.

Mr. Freeman: 1919, to be exact.

Mr. Moore: Q. And when you came to Mercoid in 1938 did you consider them a competitor?

A. Yes, they were an aggressive competitor.

187 Q. They were a serious competitor, were they?

A. Yes, sir.

Q. Now, a license was also granted to the Perfex Corporation. When you came to Mercoid in 1938 did you know anything about them then?

A. Yes, Perfex was becoming quite a factor in the heating control business at the time I became president of Mercoid.

Q. You considered Perfex a competitor of Mercoid?

A. Yes, we did.

Q. A license was also granted the Bendix Aviation, Freiz Division. When you came with the Mercoid Corporation in 1938 did you know anything about the Bendix Corporation at that time?

A. No, very little. I knew of the Bendix Corporation all right, but I was not aware that they were in the control business, until through our knowledge of White-Rodgers out of St. Louis and the fact they began distributing controls for White-Rodgers. That was my first knowledge of Bendix.

Q. When did you first hear about White-Rodgers becoming active in the control business?

A. White-Rodgers was becoming factors in the control

business at the time I became president. We were
188 conscious of them all right.

Q. A license was granted under the Freeman patent to White-Rodgers Electric Company of St. Louis. Do you consider them serious competitors?

A. Yes, they are a real competitor.

Q. Besides those five mentioned and the Minneapolis-Honeywell, does the Mercoid Corporation have any other serious competitor in temperature and responsive control apparatus?

A. Will you repeat that question, please?

(Mr. Moore's last question was read by the reporter as above recorded.)

A. I believe we would so regard the Detroit Lubricator and the line which they manufacture. They are somewhat competitive with Mercoid.

Q. They also acted as a distributor for Mercoid, did they not?

A. They did.

Q. Are they still doing so?

A. To an extent.

Mr. Moore: Direct examination closed.

189 *Cross-Examination.*

Mr. Freeman: Q. Mr. Courteol, did you tell the court this morning Mr. McCabe was a director of the Mercoid Corporation?

A. No, sir.

Q. But he is a director?

A. He is.

Q. And did you tell the court this morning Mr. McCabe was a stockholder of The Mercoid Corporation?

A. No, sir. Neither question was asked, Mr. Freeman.

Q. But he is a stockholder?

A. That is correct.

Q. I take it Mr. McCabe directs the policy with respect to controls put out and sold by The Mercoid Corporation?

A. That is all covered in the license agreement which was submitted in evidence.

Q. Will you tell us, as president of The Mercoid Corporation, just what Mr. McCabe does or has done in connection with directing the policies of the sale of controls by The Mercoid Corporation since you became president of The Mercoid Corporation in February, 1938?

A. Well, Mr. McCabe, as stated, is a director of The Mercoid Corporation, and directors of any corporation have the responsibility of involving themselves in the con-
190 duct of that corporation.

Q. I am asking about his activities under his so-called license agreement which you have testified to this morning. I want to know what he does apart from being one of several directors.

A. Well, Mr. McCabe occupies space on the premises of The Mercoid Corporation which he keeps under his own lock and key. Mr. McCabe is certainly interested in the affairs of The Mercoid Corporation, not only as a director but as a stockholder, and in regard to the policies of the company and the merchandising of controls quite obviously Mr. McCabe is interested and will take his responsible part in the formulating of policies as regards important matters having to do with The Mercoid Corporation.

Q. I do wish, Mr. Courteol, that you would answer my question. I am now asking what does Mr. McCabe do with respect to carrying out his part of the license agreement which you have testified to, apart from his duties as one of several directors?

A. Well, Mr. McCabe, in charge of his group of development men, is constantly at work on development and engineering work. Mr. McCabe does in his department give help on specifications, and his group will, when re-
191 quested, assist in such matters as wiring diagrams. Mr. McCabe, in the event of litigation, does perform under the terms of his license agreement in that he pays 50 per cent of the cost of litigation.

I don't know what questions you have in your mind. If you will be specific and ask me a specific question, I will try to answer it accordingly.

Q. Does The Mercoid Corporation make and sell any controls not approved by Mr. McCabe?

A. No, sir.

Q. Does Mercoid Corporation make and sell any controls on which it does not pay Mr. McCabe a license or royalty fee?

A. Did you say, do they "make"?

Q. And sell?

A. The answer to that is no.

Q. That is, they pay Mr. McCabe upon all controls that they make?

A. That is right.

Q. And that has been the practice and the policy of your company, so far as you know, since you became president of the company in February, 1938?

A. That is correct.

Q. So that if your company does a two million dol-
192 lar volume, why McCabe gets his percentage of the two million dollar volume, is that correct?

A. He would, if that volume all constituted controls made and sold under the terms of the license agreement. Such controls as we might job or distribute, he would not receive a royalty on.

Q. But controls manufactured—and that is what I limited my question to—by your company are all made under the license agreement, and Mr. McCabe receives a royalty on each sale?

A. That is correct.

Q. And I take it that Mr. McCabe is paying half the litigation expense in connection with the Freeman patent suit?

A. That's correct.

Q. And I take it, likewise, that Mr. McCabe is directing the policy of the litigation as to selection of counsel by way of illustration?

A. Mr. McCabe employs the same counsel in his own private work on patent applications as The Mercoid Corporation employs.

Q. The combination fan and limit control Type M-80, which you referred to this morning, was approved by McCabe before it was made and sold by The Mercoid
193 Corporation?

A. Yes, sir.

Q. And I understood, did I not, that the wiring diagrams, with respect to how controls are to be used, are likewise approved by Mr. McCabe or his organization of the ten or twelve individuals?

A. I think that is correct, yes.

Q. And when changes are made in one form of recommended use for a control to another recommended form of use of a control, I take it likewise that Mr. McCabe has his say-so?

A. Mr. McCabe is obligated—

Q. And I use the term "McCabe," referring to his organization.

A. Mr. McCabe and his organization are obligated to furnish The Mercoid Corporation with engineering assistance and advice under the terms of the license agreement.

Q. And likewise Mercoid does not do anything with respect to engineering and with respect to uses of the device, that is, putting out wiring diagrams, without Mr. McCabe's approval?

A. Well, I will state that, I will make answer—

Q. Tell us what you do. That is what I am trying to find out.

194 A. I will answer that in this way. Mr. McCabe and his group is the group on which Mercoid Corporation does rely for engineering advice and assistance, but the Mercoid Corporation itself does have an engineering officer, who is an electrical engineer, and who obviously from time to time does have ideas of his own in regard to such matters, and confers with Mr. McCabe and his group.

Q. I take it that individual is Mr. Schultz?

A. That is right.

Q. Mr. Schultz does not produce or develop devices independently of Mr. McCabe?

A. No, sir.

Q. So all of the development work of The Mercoid Corporation is done by Mr. McCabe?

A. It would be done by Mr. McCabe. It might be at times an idea might originate with Mr. Schultz or out in the field with some of our other graduate engineers, of which we have several on sales engineering, and he might take up the idea and develop it.

Q. That is, the germ of the idea is passed on to Mr. McCabe and he tells Mercoid what Mercoid may make and sell?

A. I think that is a proper statement.

195 Q. And he receives his pay, royalty or reward, whatever you want to call it, from the sale of such articles?

A. Who receives his?

Q. Mr. McCabe.

A. Mr. McCabe; that is correct.

Q. Even though the idea is developed out in the field by one of the other engineers?

A. That's correct.

Q. This morning you referred to a Minneapolis-Honeywell Regulator letter, dated November 28, 1932, Mercoid

Exhibit S; do you know whether or not that letter was written as the result of a conference between the officers of Mercoid Corporation and Mr. H. W. Sweatt?

A. I do not. That was long before my time. I simply identified it as a piece of correspondence from our files.

Q. Then, as a matter of fact, you really do not know what is meant by the letter or what it was intended to convey?

Mr. Moore: May it please your Honor, the letter was introduced in evidence and speaks for itself. The first paragraph there answers the question that is just asked the witness.

The Court: What letter is it?

196 Mr. Freeman: This is apparently, as I took it when it was introduced this morning, it was to be in the form of a threat of infringement by Minneapolis-Honeywell to The Mercoid Corporation, and I do not so read the letter. I was wondering what Mr. Courteol might say. The letter does speak for itself. No question about that. There was some mention here about laches and the threat of infringement. I was wondering what this witness knew about it.

The Court: I will let him answer.

Mr. Freeman: I ask that particularly in connection with the last paragraph of that letter which was not referred to this morning.

The Court: Let him answer.

The Witness: Will you state your question again?

Mr. Freeman: Perhaps I can simplify it.

Q. You know nothing about the letter at all, except you took it from your files?

A. That's correct.

Q. Are devices made by Mercoid actually tested before they are sold to the public?

A. Sure.

Q. And are they tested in such environments as the controls ultimately will get into, that is, a furnace
197 control is tested on a furnace?

A. Well, they would be subjected to laboratory tests, that in our judgment would parallel the usage to which they would be placed in the field.

Q. Are you telling us the M-80 was put on the market without having been tested in an actual furnace?

A. No, sir. It was tested in an actual furnace.

Q. And where was that test made or carried on?
A. In the laboratory of Mr. I. E. McCabe.
Q. In a furnace?
A. In a furnace, in an electric furnace.
Q. That is a furnace that generated heat?
A. That's correct.
Q. So the thermal member of the M-80 was responsive to furnace temperature?
A. That is correct.
Q. Were the two switches of the M-80 connected up so when the furnace got too hot the limit switch would open?
A. State the question.
(The question was read by the reporter as above recorded.)
Mr. Moore: May it please the court, I object to this line of questioning. The witness has not testified he has witnessed any tests or had anything to do with the McCabe
198 development department or what went on within that department.
Mr. Freeman: I am trying to find out what McCabe does with respect to this company following the license agreement they put in wherein they say McCabe does everything. I am trying to find out what McCabe does.
The Court: Let him answer.
The Witness: Read the question again.
(The question was again read by the reporter as above recorded.)
Mr. Moore: I have no objection to the witness answering any questions that he knows of his own personal knowledge or experience.
The Witness: A. I have no knowledge, I have no engineering knowledge, and I am not possessed of sufficient knowledge to answer those questions. I do know Mr. McCabe has tested equipment in his laboratory. I do know that he tests the equipment before it is turned over to The Mercoid Corporation for manufacture and sale. It has been our experience that when the products are so developed and tested and given over to The Mercoid Corporation that we could sell them under the representations which he makes. Beyond that, I am not able to give you an intimate picture of what goes on in Mr. McCabe's
199 laboratory.
Mr. Freeman: Q. Do you know whether or not the M-80 was tested by the Mercoid Corporation in connection with an oil burner warm air operated furnace?

A. No. I would like to qualify that. Mr. McCabe does also have a piece of equipment in his laboratory in which he installs oil burners when he sees fit for the testing of equipment, and it is my opinion he might conduct tests of that sort on any of the switches of his development.

Mr. Freeman: I might ask if Mr. McCabe is going to testify, Mr. Moore. I might shorten some of the examination as to the activities of Mr. McCabe with The Mercoid Corporation.

Mr. Moore: I saw no need in calling Mr. McCabe as a witness in this case, and I had not expected to do so.

Mr. Freeman: Q. Do you know whether or not, then, that the M-80 was tested for use in connection with the gas fired warm air furnace?

A. I do not.

Q. Before you began selling controls for that purpose?

A. No, I do not know.

Q. Do you know whether or not the M-80 was used in connection with a stoker or coal fired furnace?

200 A. No, I don't know. It seems quite evident to me, though, that an M-80 control under one condition of heat, whether the condition is produced by oil burner, gas, electric or coal, would have the same operating characteristics save such things as corrosion, accumulation of soot, and so forth.

Q. So far as the sequence of operation of your M-80, whether the bimetal which is responsive to furnace temperature is operated as a result of temperature created by gas flame, or oil operated flame, or coal fired plant, it is all one and the same?

A. With the qualification that I stated.

Q. In the M-80 it is true, is it not, the limit switch may move to open circuit position as a result of high furnace temperature, while the fan switch remains closed?

Mr. Moore: May it please your Honor, this witness did not testify how any of these instruments operated. He merely produced them. He is not qualified as being competent to describe their technical construction and operation.

The Court: What is the question?

(The question was read by the reporter as above recorded.)

Mr. Freeman: That is a very simple question.

201 The Court: Do you know?

The Witness: Yes, sir. It would.

The Court: I want you to stay within the direct so far as possible and we will get along very much better.

The Witness: I would only like to make this statement. I am not an engineer or a technical person. I am more concerned with the merchandising and sale of Mercoid controls. Some of these things I know; some of them I don't know, and in those cases I will simply have to say so. I am not an expert witness.

Mr. Freeman: Q. You do know, do you not, The Mercoid Corporation put out a booklet entitled "Mercoid Wiring Diagrams for Oil Burner Installations," which booklet we will mark for identification as M-H EXHIBIT 10?

(Handing document to the witness.)

A. Yes, we put that out.

(The document was so marked.)

Mr. Freeman: Q. With the approval of Mr. McCabe and his organization?

A. I don't know whether Mr. McCabe gave his formal approval on that or not. I have an idea that he did look over those diagrams or some persons in his organization.

Q. And the diagram drawing No. 2403 does refer 202 to a combination fan and limit control Type M-80, does it not?

A. That is correct.

Q. And that is a control corresponding to the physical devices that we have here in court, to which you referred or testified with respect to this morning?

A. That's correct.

Q. And likewise The Mercoid Corporation put out the bulletin entitled "Mercoid Wiring Diagrams for Various Stoker Installations," is that correct?

A. That is correct.

(Handing book to the witness.)

Q. And the booklet that I have just handed to you with respect to stoker installations is identified as M-H Exhibit No. 11. That was put out, I take it, under the direction or with the approval at least of Mr. McCabe and his organization?

A. It probably was submitted to them before it was put out.

(The document was so marked.)

Mr. Freeman: Q. And likewise on drawing No. 2407 there is a combination fan and limit switch illustrated Type M corresponding to the physical devices that you produced here in court this morning?

203 A. Yes, sir.

Q. And I take it that whether you operate the furnace by oil or coal that you get the same sequence of operation, that is, the limit switch can be opened to shut down the burner or the motor or check the rate of fuel going into the combustion box while the fan can still run?

A. That is correct.

Mr. Freeman: We offer in evidence as M-H EXHIBIT NO. 10 the booklet entitled "Mercoid Wiring Diagrams for Oil Burner Installations," and as M-H EXHIBIT NO. 11 the booklet entitled "Mercoid Wiring Diagrams for Various Stoker Installations."

Q. You referred to Mr. Frank R. Black this morning doing some work for Mercoid. Will you tell us what that work was, since you became president of Mercoid Corporation?

A. I didn't testify that Mr. Black did any work for Mercoid. I said he was delegated by Mr. McCabe to work with Mr. Langdon Moore, our patent counsel.

Mr. Moore: When I attempted to show what he did, Mr. Freeman objected. I do not think he now can come back and ask the same question of the witness, when he objected to my asking him the question this morning.

204 Mr. Freeman: If you are telling us he does not work for Mercoid, as far as I am concerned, I am perfectly willing to withdraw the question.

The Court: Why are we going into the relationship between Mercoid and Mr. McCabe?

Mr. Moore: I merely brought in the license, your Honor, because the controls that Mercoid put out, and which are going to be shown in all of the literature and different things, were the inventions of Mr. McCabe, and were not owned by Mercoid, but were made and sold under a license. Mr. McCabe acts as an individual and licenses Mercoid Corporation, although he is a stockholder of it, but he is not an officer. I don't know why Mr. Freeman is probing into that relationship.

Mr. Freeman: I don't want to be surprised as to what you may say or what you may do as a result of the license agreement which you produced.

The Court: If I understand this lawsuit—probably I do not—I don't know why we should go into the relationship between Mr. McCabe and Mercoid, other than to show if he owns the patent and Mercoid has a license, and that is

all there is to it, if it is a license. Is there anything more to it?

Mr. Moore: The only thing, Mr. McCabe employs a 205 development department separate and distinct from Mercoid, and Mr. Frank Black has been with him for a long time. I am calling Mr. Frank Black to explain the various developments of Mr. McCabe, and I had to lay a basis.

The Court: What do we care what the developments of Mr. McCabe are? Why?

Mr. Moore: Because that is the issue of the suit here, your Honor. These controls—the Mercoid does not make burners—they have been making them since 1922 and they had them on the market. Now, the owner of this system patent is trying to make us pay a royalty on them.

The Court: Mr. Frank Black comes on and says, "I am an engineer, had MIT, graduated, and been practicing my profession—"

Mr. Moore: No, sir, he does not. That is just the trouble.

The Court: Or what does he say he is?

Mr. Moore: He says he started out as a draftsman and has become acquainted by actually making the drawings of the Patent Office drawings and instruments and developments, and he can identify them, and he also has assisted me the last fourteen years in preparing McCabe applications, and he knows the prior art.

The Court: That may be. We spent about a day 206 building up Mr. Black. I hope he won't be a disappointment. That is all we are doing. I don't see the reason for going into the relationship between Mr. McCabe and Mercoid, except to show the license.

Mr. Moore: Mr. Black has discussed all these things with me. That is the only relationship I want to show. I don't know why Mr. Freeman is trying to dig in any further than just the license.

The Court: Of course, I don't know your case at all. I just don't see it. That is all.

Mr. Freeman: Getting back now to the license, I am perfectly willing to limit my questions to the license with the understanding that Mr. Moore will stick to the license and not wander far afield.

Q. Are there any other documents with respect to the license, other than those that you produced this morning?

A. The license? Which license?

Q. The license we have been talking about, McCabe to Mercoid, the catch-all license, the one where he gets a percent of everything Mercoid does?

A. This license that we testified to this morning, together with the supplement, is the license that governs the relationship between us and Mr. McCabe. There are no other license agreements in effect between Mr. McCabe
207 and The Mercoid Corporation.

Q. In other words, the two documents that have been here produced, the license and the so-called supplemental agreement, are all of the documents between McCabe by which he licenses Mercoid?

A. Correct.

Q. And by which Mercoid manufactures under some of the McCabe patents or applications?

A. That is correct.

Q. There are no other documents?

A. That is correct.

Q. And all of the money that is paid to Mr. McCabe is paid in accordance with those two agreements?

A. That is correct.

Q. And all of the rights then coming from McCabe to The Mercoid Corporation are all contained in the two agreements?

A. All embodied in those two agreements.

Q. There are no other oral or any other understandings?

A. The two agreements constitute the entire relationship between Mr. McCabe and The Mercoid Corporation. I can't answer it any more positively.

Q. That is all I want to know.

The Court: What are those agreements?

208 Mr. Bair: Exhibit P.

Mr. Moore: The first one in that book, your Honor.

The Court: These two McCabe licenses, those are the two papers?

Mr. Freeman: They are all of the papers as to the relationship between McCabe and Mercoid, so we are informed.

The Witness: I would like to have that question asked again. I think maybe I have overlooked something here which is not material, but which does exist, and I would like to have the whole thing correct.

Mr. Freeman: Q. That is all I want to do. I want to get the facts.

A. I made the statement here the license agreement and supplement covers the relationship between Mercoid Corporation, the Federal Gauge Company and Mr. I. E. McCabe. That statement stands, to the best of my knowledge.

Q. As president of the corporation, if you were operating under any other agreements you would know, would you not?

A. Yes, sir.

Q. So that that added "to the best of my knowledge" is put in for what purpose—sort of a saving clause?

209 A. I think I have given you the best of my knowledge and I can't give you any more.

Q. You will get us a copy of that agreement that is referred to and that license agreement between, I think, Arcless and McCabe or Mercoid?

A. Yes, we will have that. That does not apply today. That goes away back to the time when Arcless was owned by an outside individual.

Q. All I want is the documents that have to do with the relationship between Mercoid and McCabe. As to whether they have a bearing today or not is immaterial. I want to know what agreements there are outstanding as of today that have not been cancelled.

A. That is right.

Mr. Moore: You asked us that this morning. We told you we would look through our records and provide them and bring them down and show them to you.

The Witness: That is correct. That was the agreement Mr. Moore referred to as the Arcless.

Mr. Freeman: Q. Did I understand you to say the Baker patent covered a two-speed fan?

A. That is my understanding of it. I am not a patent expert, but that is my understanding.

Q. I was wondering where you got that information?

A. I looked at the patent.

210 Q. Does it say a two-speed fan?

A. I believe it does. It says two-speed control to govern a two-speed fan.

Q. Will you look at it beyond the title of the patent?

A. I read herewith:

"An object of the invention, therefore, resides in an improved control apparatus adapted particularly for warm air heating systems in which a blower or the like may oper-

ate to furnish forced draft both to the furnace and warm air duct leading to the room or rooms to be heated, or to the warm air duct alone, either at high or low speed"—That is two-speed.

—"depending upon the temperature of the furnace bonnet at the time the room thermostat calls for heat."

I had read that paragraph to simply satisfy myself it did cover a two-speed. I haven't read the rest of the patent. I am not qualified to discuss the patent.

Q. You do know as a matter of fact in the manufacture and sale of Mercoid two-speed fan controls that you still have the limit switch moving to an open circuit position and the fan continuing to run?

A. That would be possible in the circuit with the M-80 as the control, yes.

Q. So that the sequence of operation with respect
211 to the two-speed fan device manufactured by Mercoid is no different than the M-80 which has a single speed fan operating device?

A. I don't know as—I could not discuss that.

Q. All right. Do you know, Mr. Courteol, as the president of Mercoid Corporation, whether or not your men in the field—I think you said you had some ten or twelve—whether they help make installations?

A. I testified this morning that we had a policy against our men making installations. They are not authorized to make any installations in the field.

Q. I am asking you now whether they assist or supervise or go along when your equipment is put in somebody's basement merely to see the devices are put in in accordance with the wiring instructions—

A. No.

Q. (Continuing.)—and installation instructions put out and furnished by your company?

A. If an installer got into much trouble with an installation, it is true he might call one of our men out there to take a look at it. Our man would perhaps take a look at the controls to see if he had them hooked up right and would no doubt tell him, he would be expected to tell
212 him if he had them hooked up wrong. As far as that is concerned, they probably would refer to some of the diagrams which the salesman would have in his possession as a matter of check. But as far as making installations of a furnace system, no, they have no such authority, and it would not be countenanced by the company.

Q. So when a salesman is called in on account of some trouble, the salesman as you say then checks the controls and the hook-up to the control to see if the hook-up is in accordance with the instructions put out by The Mercoid Corporation?

A. He might do it. It would be a very natural thing for him to do.

Q. Your company does put out a group of wiring instructions with its M-80 control, does it not?

A. That is correct.

Q. And you do expect your customers to hook up or connect the controls that you furnish in accordance with such wiring instructions?

A. That is not correct. Our customers have a perfect right to hook up these controls any way they see fit and we run into some unusual hook-ups at times, and it happens frequently they have taken one of our controls and worked it into some circuit that appeals to them, and we don't
213 require them to follow our diagrams. They can do as they please.

Q. What is the purpose of furnishing wiring diagrams and installation instructions if you ask or desire your customers to hook them up as they please?

A. Quite obviously they are a set of diagrams which if followed they would get a performance out of the control such as represented in the bulletin or the installation instructions.

Q. And if a control is found in the field wired up other than in accordance with your instructions, or as you intended the control to be hooked up, do you still stand back of that control if anything goes wrong?

A. Well, that would depend. If he went out in the field and found the control had been hooked up in such a way as to short circuit it, ruin it, sure, the diagram would be checked, and all the information he could get there because the fellow might say, "I want credit on this defective control." Maybe he made a misapplication of it in the circuit.

Q. So the service man or salesman or your sales representative then checks back to see whether the control has been properly connected up in accordance with your suggested hook-up or instructions that go along with the
214 control when sold?

A. Of course, we are talking about that odd case where one of our men might be called in. If you recall my

testimony this morning, I said we manufacture and sell some five or six hundred thousand devices a year, and with twelve or fifteen men quite obviously we have to keep before the customer our section in the catalog in reference to defective controls. I mean, if he made this installation in the field and something went wrong with the control, he might have had the circuit wrong, and all that, but the catalog does not say, "Get in touch with The Mercoid Corporation and we will send a service man out." It says, "Take the control down and send it in and we will check it. If it is found to be defective we will replace it."

I mean, after all, with twelve or fifteen men spread around all over the United States, we are talking about a very odd situation when we are discussing all this service man would do.

Q. Well, you do guarantee your controls when applied in the manner that you suggest they be applied?

A. That is correct.

Q. And whenever a control is applied in some other condition, or not in accordance with the particular ap-
215 plication of that particular control, then your warranty or guarantee does not apply?

A. Well, if we found it had been a misapplication, and that was evident, yes, your statement is correct. It is pretty hard to determine, though.

Q. Well, you would call a proper application of the M-80 if one was sold to me and I connected it up in accordance with the wiring diagrams for the M-80 as shown in the Mercoid wiring diagrams booklet, M-H Exhibit 10, would you not?

A. Yes.

Q. And then I would be guaranteed against any defective control, because I had applied it in accordance with your application drawings?

A. I think that is the sense of our trade relationship, yes.

Q. And whenever a control is connected up in some manner other than the application suggested and passed on to the trade, then the guarantee is off?

A. Well, that would depend on the examination of the control. The control might be hooked up at variance with our wiring diagrams and yet might still have been properly used. I don't want to convey any impression that he would have to handle it exactly in accordance with those dia-

216 grams in order to qualify for a replacement. That is not correct. That is not any thought I wish to convey by these answers. I want to emphasize that.

Q. Does General Electric Company manufacture controls?

A. I think perhaps they do manufacture certain controls although we see so little of them in the field that they don't register with us as competition. They are a good customer of ours, in fact.

Q. They are also a competitor of yours in the manufacture and sale of controls. But now when you spoke about serious competition, you used that word "serious", just what do you mean?

A. I said aggressive or real. I don't think I used the term "serious" in any answer.

Q. I understand you to say you did not consider Cook Electric Company serious competition. If you want to use the word "aggressive," you go right ahead. Would you tell me what you mean by "aggressive competition"?

A. Well, I mean by aggressive competition, the competition of a concern whose volume, let us say, makes itself felt in our merchandising picture.

Q. Did you know of the H. M. Sheer Company of Quincy?

A. Never heard of them.

Q. Do you know the Russell Electric Company?

217 A. Well, I have heard of the Russell Electric Company in years past. I didn't know they were still in the business or not.

Q. When you talked about competition in connection with controls, as you testified this morning, were you referring to the general line of controls, or were you referring merely to competition with respect to combination fan and limit switches?

A. Well, I think I was referring to the general business of automatic electrical controls. We consider our whole line when we are thinking about competition. We don't consider just some few items in our line, no.

Q. So a company might be an aggressive competitor of yours even though it did not make a combination fan and limit switch?

A. Oh, it could.

Q. That is what you were talking about this morning when you testified as to competition?

A. I was talking about competition in general.

Q. You were not in any way directing your attention specifically to combination fans and limit controls?

A. That was included, obviously, because we have some companies which are highly aggressive in the M-80 as competitors. In fact, that has been one of the most com-
218 petitive controls that we have manufactured and sold in the past two or three years. There has been some awfully tough competition in that particular control.

Q. What price do you get for the control at the present time? I am talking about minimum price.

A. Our minimum price is $4.75 for the standard M-80 control with the universal flange.

Q. And that price has been a downward trend all the time, has it not?

A. It has with us.

Q. And isn't that true with the other control companies generally?

A. Well, from such information as I have it has stayed constantly at the $5.25 level for the last three or four years.

Q. You do not know about the price prior to the last three or four years?

A. I could not testify to it because I was not identified with the business four years ago.

Q. The Mercoid price, you said, was $4.75?

A. That is correct.

Q. And the rest of your competition, generally speaking, is around $5.25?

A. That is my understanding.

219 Q. We are talking about 1941 and 1942.

A. Yes.

Mr. Freeman: That is all.

The Court: Any redirect?

Redirect Examination by Mr. Moore.

Q. Mr. Courteol, you have been asked a good many questions about what you guarantee under certain conditions in regard to Mercoid controls. On page 60 of your catalog of 1940, which has been introduced in evidence as Mercoid Exhibit Q, there appears our guarantee. I will read it to you:

"We guarantee Mercoid products to be free from defects in workmanship or material, and will, without charge, replace or repair within one year from date of shipment from

our factory any product that may be found defective upon inspection at our factory. This guarantee does not obligate us where products have been subjected to careless handling, improper application or faulty installation, and we expressly disclaim any obligation, guaranty or liability whatsoever except as above stated."

Now, do you make any departure from the guaranty as written here?

A. That is our guaranty.

Mr. Moore: That is all. Redirect closed.

220 Mr. Moore: May it please the court, at this point I would like to introduce in evidence the depositions taken in Chicago on October 27, 1941, of Mr. Willard L. Huff and Mr. Harold W. Sweatt, president of Minneapolis-Honeywell, as MERCOID EXHIBIT O, and the EXHIBITS K, L, M and N attached to this deposition.

(The documents were so marked.)

Mr. Moore: It might be said that Exhibits K, L and N have been referred to by Mr. Courteol and Exhibits L and N have been introduced in evidence. Exhibit K was questionable, I believe, and the question remains as to whether or not we can arrive at the date satisfactorily.

I also introduce Exhibit M attached to these depo-
221 sitions as MERCOID EXHIBIT M.

Now, I wish to call the court's attention to the following passages in the deposition of Mr. Huff, vice president and treasurer of Minneapolis-Honeywell.

On page 5 of this deposition in question 13 he was asked:

"Now, Minneapolis-Honeywell has introduced or furnished Mercoid copies of licenses under the Freeman patent granted to the Cook Electric Company, the Penn Electric Switch Company, Perfex Corporation, Bendix Aviation Corporation, and White-Rodgers Company. You are familiar with those licenses, are you not?

"A. I am."

And on page 6, questions 16, 17 and 18 and the answers thereto. In question 16 Mr. Huff was asked:

"Your letter of May 7, 1940, has been set up by the Mercoid in the pleadings, and I notice that it is addressed to Mr. C. J. Swan, Detroit Lubricator Company, and Mr. Ira McCabe of The Mercoid Corporation. Was Minneapolis-Honeywell negotiating the granting of a license to the Detroit Lubricator Company at that time?

222 "A. Yes.

"Q. 17. Do you know whether or not a license was ever executed?

"A. It was not executed by Detroit Lubricator Company."

On page 14:

"Q. 52. You stated that the Detroit Lubricator Company never did execute a license on the Freeman patent?

"A. That is correct."

And on page 15:

"Q. 53. Did they give any reason?

"A. There was apparently some difference of opinion as between the management of the company—I am speaking of Detroit Lubricator Company—in their patent department as to whether or not they should take this license."

Referring back to page 10, question 33 and its answer:

"Q. 33. Now, calling attention to your letter of May 7, 1940, addressed to Mr. Swan and Mr. McCabe, there were two carbons attached to that letter and you state in this letter:—"

The letter is then quoted.

223 "I call your attention to that letter and also to the carbons attached to it. Now, are those the changes that were submitted to the White-Rodgers Company that you have just referred to?

"A. They were, except I want to call your attention to a typographical error which appears in the second carbon copy of the letter, where a reference is made to 25 per cent, which should have read 25 cents."

On page 11, questions 35, 38, 39 and 40. In question 35 Mr. Huff was asked:

"Now, these two carbons attached to your letter of May 7th, which you say were submitted to White-Rodgers, calling attention to an error in the second one, were they dictated by Mr. Harold W. Sweatt, the president of the company?

"A. I cannot be sure, but it would appear from this carbon copy that that was the case."

"Q. 38. Now, were these same changes submitted to the other licensees who had already obtained licenses at that time?

"A. I do not know at what time they were submitted to the other licensees, but they were submitted.

224 "Q. 39. So all of the present licensees that I have referred to here did receive this change or amendment to the license?

"A. I think that is true.

"Q. 40. In your letter of October 7th you stated:

'It has just been called to my attention that with my letter of May 7, 1940, addressed to you,'

and you referred to that typographical error.

"A. The answer is yes.

"Q. 41. Who called that to your attention?

"A. I do not recall.

"Q. 42. It was called to your attention apparently just before you wrote this letter, was it not?

"A. Apparently so."

On page 13:

"Q. 47. These two amendments to your license agreement attached to your letter of October 7th are carbon copies. Do you know whether the original of these carbon copies was actually mailed to any of the licensees that you have referred to?

"A. As I recall it, the originals which were a part of the first licenses granted did not carry that error; that

225 the typographical error occurred at the time I submitted these two supplemental letters to Mercoid Corporation and to Detroit Lubricator Company."

226 Mr. Moore: The letters speak for themselves.

Now, I would also like to call the court's attention to the deposition of Mr. Harold W. Sweatt, on page 19 of the deposition, questions 12 and 16. In question 12 Mr. Sweatt was asked:

"I believe the pleadings set up that the Freeman patent was assigned to Minneapolis-Honeywell on April 14, 1932, and it was during that year that you called this patent to the attention of the Mercoid Corporation in this letter, was it not?

"A. I called their attention on November 29, 1932."

"Q. 16. I believe that Mr. Huff testified that certain changes or amplifications had been made in those original agreements in accordance with his letter that he referred to of May 7th, and that is that they now incorporated these two paragraphs attached to that letter.

227 "A. There were letters to these licensees covering this general subject. I cannot testify to more than that."

On page 20:

"Q. 17. These two paragraphs are apparently prepared for your signature. Do you know whether or not you signed those?

"A. I imagine that I did.

"Q. 18. The initials in the lower left hand corner would ordinarily indicate that you so dictated them.

"A. That would so indicate."

On page 22, question 31, in reference to the definition of the combination furnace control, he was asked:

"I notice this definition starts:

'Used in this agreement the expression "combination furnace control" shall mean a unitary structure, including at least a switching means for controlling not less than two circuits.'

What is your understanding of a unitary structure?

"A. A unitary structure, I assume, means the elements, the combination furnace and controls, are contained in a single unit."

228 On page 23:

"Q. 35. Now, considering the remainder of that definition, am I to understand that this unitary structure with these binding posts is to be connected only in the manner specified in this definition, or does the Freeman patent cover any and all connections that might be made to these binding posts to control the operation of a fan and the operation of a heat generating medium?

"Mr. Bair: That is objected to on the ground that the patent itself is the best evidence as to what it covers, and also on the ground that this witness does not purport to be a patent expert, and that the evidence called for is improper because it is expert testimony.

"Mr. Moore: The evidence shows that the witness is an inventor, and is the inventor of a system which might be called analogous to the Freeman patent, and he should be able to answer that question without having expert knowledge.

"A. My answer is I do not know."

In question 37 on page 24 the witness' attention is called

to a certain exception made in the license agreement, and the exception was read:

229 "'Temperature indicating means to indicate the temperature and the thermal means of the "combination furnace control" and a summer adjustment or locking means to provide fan operation only in the summer shall not be considered for the purpose of this agreement as an extra.'

"Do you know whether or not Minneapolis-Honeywell owns a patent on a summer adjustment or locking means to provide fan operation only in the summer?

"A. I do not know."

Page 26:

"Q. 44. The third item is, 'The net minimum price for a combination furnace control operable at two speeds shall be,' and then the price.

"A. I do not see any question in that.

"Q. 45. Is a combination control operable at two speeds referred to anywhere in the license agreement that you know of, other than the price schedule?

"A. I do not believe it is.

"Q. 46. Does the Minneapolis-Honeywell own a patent on a combination furnace control operable at two speeds?

"A. I do not know.

230 "Q. 47. Is it not a fact that Minneapolis-Honeywell owns the Kriechbaum patent upon a combination furnace control, a patent operable at two speeds?

"A. They owned the Kriechbaum patent, No. 2,222,800, which you have shown me.

"Q. 48. Is it not a fact that the application of this Kriechbaum patent became involved in an interference with a man by the name of Baker while in the Patent Office?

"A. I do not know.

"Q. 49. And the Baker patent later became patent No. 2,230,446?

"A. I do not know.

"Q. 50. I show you here a certified copy of the assignment or license agreement, rather, recorded in the United States Patent Office on May 22, 1939, in Liber K 179, page 323, which is an agreement between the Minneapolis-Honeywell Regulator Company and the Cook Electric Company. Are you at all familiar with that?

"A. I do not think I am."

"Q. 52. As president, would you not be presumed
231 to know of this agreement?

"A. I very probably did at the time, but as to the details of it, I have no recollection."

"Q. 55. I call your attention to paragraph 7 of this agreement.

"The Witness: I have read it.

"Q. 56. This Section 7 of this agreement, executed March 31, 1939, reads as follows:

'The acceptance of a license this day by Cook Electric Company from Minneapolis-Honeywell Regulator Company under a Freeman patent No. 1,813,732, does not impliedly give any right to the latter company to grant sublicenses to its other licensees under said Freeman patent on two-speed operation as covered by said Baker application or any other application or patent owned or controlled by Cook Electric Company.'"

Then the witness was asked:

"The acceptance of a license this day by Cook Electric Company from Minneapolis-Honeywell Regulator Company under the Freen an patent is the license first referred to as being granted to the Cook Electric Company on the 31st day of March, 1939, is it not?

232 "A. I would assume so. It could not be anything else.

"Q. 57. My understanding of that section would be that this agreement prevents Minneapolis-Honeywell from granting sublicenses to its other licensees under the Freeman patent."

The answer is on page 30:

"A. I do not know what your understanding is."

"Q. 59. Well, what is your understanding?

"A. My understanding would be that Minneapolis-Honeywell was not impliedly given any rights to grant such licenses under the other licenses under the Freeman patent.

"Q. 60. I believe you stated that you did not know or were not acquainted with any of the negotiations leading up to this Cook agreement, either the original license or this one.

"A. I do not want to state that because very possibly at the time I was. What I meant to say is that I do not

recollect the details of this agreement, when you showed it to me.

"Q. 61. Then you might have been present at conferences in which this interference was negotiated?

233 "A. I do not believe I was, but I might have been familiar with the negotiations at the time.

"Q. 62. Could you state whether or not Mr. Charles B. Sweatt, who signed both of these agreements for the company, would be more interested in these negotiations and have a better recollection?

"A. I would doubt it, because generally he is not very familiar with patent matters. I do not recollect how these came up."

On page 31:

"Q. 63. You generally handle the patent matters?

"A. Only from a broad policy standpoint."

"Q. 68. It is the policy of the company to notify alleged infringers of any infringement of a patent, is it not?

"A. Generally speaking."

Page 32:

"Q. 70. Can you state whether or not between the time Minneapolis-Honeywell became the owner of this Freeman patent in 1932 and the time that the Cook Electric license was granted in 1939 you sent out notices of infringement to alleged infringers?

"A. I believe we did.

"Q. 71. Is it not a fact that you did notify the White

234 Manufacturing Company, manufacturers of electrical supplies, in St. Paul, Minnesota, that they were infringing the Freeman patent in 1938?

"A. My memory is not clear one way or the other.

"Q. 72. Is the name White Manufacturing Company at all familiar to you?

"A. Yes, I know the White Manufacturing Company.'

"Q. 75. Here are the five licenses. There were no other licenses granted under the Freeman patent other than the ones that were presented?

"A. I know of no other licenses."

Page 33:

"Q. 76. Referring to the Freeman patent in suit, that shows a room thermostat, does it not?

"A. It does.

"Q. 77. And the Minneapolis-Honeywell and their predecessors both manufactured room thermostats for a long time?

"A. They did.

"Q. 78. It also shows a warm air furnace control, indicated by 24, I think.

"A. It shows a switch of the type which opens the circuit when a predetermined temperature has been exceeded.

235 "Q. 79. That is called a warm air furnace control, is it not?

"A. It is used on a warm air furnace.

"Q. 80. The Minneapolis-Honeywell made switches of that character long before the Freeman patent came out, did they not?"

Answer on page 34:

"I think they did."

Mr. Freeman: Why don't you read the objection and the statement that you made, so that the court will know that between the question and the answer there were other matters referred to?

Mr. Moore: The court does not want to unnecessarily burden the record, but if you request that it be done I will be glad to do it.

Mr. Freeman: How can the court get the full import of what is going on if you select a question and there are certain statements made in between and then you give the answer?

Mr. Moore: I am merely calling the court's attention to this.

Mr. Freeman: I don't want to burden the court either.

Mr. Moore: I am merely calling the court's attention to this, but I will read the whole thing, if you want me

236 to.

Mr. Freeman: I think it is the better way to do it, if it is just part of it.

Mr. Moore: Following question 80:

"Mr. Freeman: Mr. Moore, do you mean furnace controls generally, or do you mean furnace controls of the kind specifically referred to in the Freeman patent?

"Mr. Moore: Now, just a minute. The paragraph beginning line 6, page 2, of the Freeman patent reads as follows:

"'The switch 24 is of the type which opens its circuit when a predetermined temperature has been exceeded. This temperature is so chosen that the circuit within the switch is opened when the furnace has been heated to such a point that further heating might prove dangerous.'

"And the furnace as disclosed in Figure 2 is a warm air furnace. Now, the question is did Minneapolis-Honeywell make switches which answer this description long before the Freeman patent was granted.

"A. I think they did.

"Q. 81. This patent also shows a booster fan or a fan for increasing the circulation through the warm air furnace in Figure 2, and it shows a dotted square indicated by
237 the number 23. The paragraph beginning line 89, page 1 of the patent, states:

'The switch 23 is of a type which closes its circuit only when a predetermined temperature is exceeded. This temperature is so chosen that the circuit within the switch 23 is only completed when the furnace hood has been heated to a temperature greater than normal room temperature. Thus the fan 21 will not be operated if the furnace has not reached a temperature at which the air would be heated above room temperature. In other words, the fan 21 can never operate to force unheated air into the rooms to be heated while this control is in operation.'

"Now, do you know whether or not Minneapolis-Honeywell put on the market controls which would answer that description of that switch?

"A. I do not know."

"Q. 83. According to your last answer, you are not quite positive what controls Minneapolis-Honeywell makes, are you?

"A. I cannot be familiar with the details of all of them.

"Q. 84. Is there any official in your company who would know all the details of the various controls that you make?

"A. I am afraid there would be no official that
238 would know the details of all of them.

"Q. 85. Is there any employee in your company who would particularly qualify as to that?

"A. I doubt if there would be any one employee who would know the details of all of them.

"Q. 86. I understood you to say you were only interested in the broad principles of policy in connection with your patents. Is there any official in your company whose

responsibility is to know thoroughly the contents of your various licenses and agreements that are issued or granted by the company?

"A. One official who would know all?

"Q. 87. Yes.

"A. I do not believe so.

"Q. 88. Then you do not let your right hand know what your left hand is doing?

"A. If you have too many details one person cannot know them all. That is all there is to that."

On page 36:

"Q. 92. Do you establish the policy for issuing licenses under these patents?

"Mr. Freeman: You mean Mr. Sweatt personally?

239 "Mr. Moore: He said he was mostly interested in the broad policies of the company in connection with patents.

"A. I might or might not, Mr. Moore.

"Q. 93. Would Mr. Fisher actually prepare the terms of these license agreements?

"A. Mr. Fisher or other counsel that we might use.

"Q. 94. And Mr. Freeman of Bair & Freeman might also?

"A. Mr. Freeman might.

"Q. 95. Does Mr. Bair also prepare licenses for the company, do you know, or does Mr. Freeman generally handle that for the firm?

"A. I think Mr. Bair might have. I would not remember.

"Q. 96. Then you do rely upon the advice of your attorneys in establishing policies on these licenses and the terms of the licenses?

"A. That is what we hire them for."

Mr. Freeman: Would you mind reading question 90 as well as 91 and the answers as to who might know more about the details than Mr. Sweatt, on page 36?

Mr. Moore: Question 90 on page 36:

240 "Well, is there anybody in the company who would be more familiar than you are with those circumstances?

"A. I think probably Mr. Fisher might be.

"Q. 91. Then if we want any more detailed information we would have to ask Mr. Fisher?

"A. I would think so."

FRANK R. BLACK, called as a witness on behalf of the complainant, being first duly sworn, testified as follows:

Direct Examination by Mr. Moore.

Q. Will you please state your name, age, residence and occupation?

A. Frank R. Black, age 37, residence 1651 North Malvina Avenue, Chicago.

I am a member of Mr. McCabe's engineering depart-
241 ment, where I was originally employed as a draftsman.

In the following years I handled various details or supervised their handling relating to the construction, design, manufacture and sale of temperature and pressure electric switches which Mr. McCabe developed and designed for sale by the then Federal Gauge Company.

My duties also included the handling of details relating to patent matters and patent applications involving the controls which Mr. McCabe created and designed.

Q. When did you first enter the employ of Mr. McCabe?

A. About December, 1925.

Q. You state you handled details relating to patent matters. What do you mean by that?

A. I prepared Patent Office drawings, in most instances from the actual device as it was sold. I had previously prepared the details relating to the construction of that apparatus or control and thereafter prepared Patent Office drawings. These drawings were turned over to Mr. Langdon Moore, patent counsel for Mr. McCabe, and prior to seeing Mr. Moore about this particular patent I would have conferences and understandings with Mr. McCabe relating to the subject matter and the invention upon which patent application was to be filed.

I prepared written explanations of the contents of
242 the invention and submitted those to Mr. Moore and conferred with him generally on the entire subject relating to that patent.

Q. Do you still do that?

A. Yes, sir, I do.

Q. Did you have anything further to do with these applications for patent filed by Mr. McCabe than submitting to Mr. Moore a description of the device?

A. Yes, sir. Following the preparation of the appli-

cation it was my duty to review that application and check it before it was finally approved for filing.

Following the filing of the application, when amendments were required, I considered the various prior art cited against the patent and analyzed the claims involved and the objections made by the Patent Office, and passed on to Mr. Moore my view of the objections, with suggestions, and in many instances suggested claims that could be added to the patent application to overcome those objections.

Q. Who ordered copies of these references cited by the Patent Office?

A. It has been a practice of Mr. Moore to supply Mr. McCabe's department with the amendments and all papers that are filed in behalf of Mr. McCabe or that are re-
243 ceived from the Patent Office relating to the application, and it has been my practice upon receiving copies of the papers from the Patent Office to procure the patents cited on that application, study them and apply them to Mr. McCabe's invention.

Q. Then who is responsible for the assembling of these patents that you refer to, in Mr. McCabe's patent department?

A. I am responsible.

Q. Then you have in Mr. McCabe's patent department under your custody prior art patents cited during the prosecution of those various McCabe applications, is that right?

A. Yes, sir. In late years Mr. McCabe has left to me the sole responsibility of handling the patent matters relating to his patent applications.

Q. Now, are you thoroughly familiar with the various controls developed by Mr. McCabe?

A. Yes, sir, I am.

Q. How did you become familiar with them?

A. From the beginning of my original employment in 1925 I helped or did actually make the drawings for fabrication of those articles, the patent office drawings, and I have collaborated with various of Mr. McCabe's en-
244 gineers and the sales engineers of the Mercoid Corporation in devising or preparing wiring diagrams which employ temperature and pressure responsive devices for controls of various kinds of apparatus.

Q. Did you have any experience with the controls as instrumentalities themselves?

A. Yes. As I said, I prepared the drawings and in many instances supervised the first assembly of them.

Q. Did your duties change at all or was anything added to them in about 1930?

A. Yes, sir. In the early thirties the Mercoid Corporation became involved in litigation and it was my duty thereafter, with the permission, of course, of Mr. McCabe, to assist patent counsel in the gathering and collection of evidence necessary in our behalf in these cases. I also had permission from The Mercoid Corporation officers to have full access to their office records and to gather such information as I saw fit as was necessary in connection with those cases.

Q. How many cases or infringement suits have you assisted Mr. Moore in, in the manner you have just stated?

A. I would say they would number at least eight and might include interference proceedings in one or two
245 instances.

Q. Have you ever testified in the federal court in a patent suit in explaining patents and the prior art to the court?

A. Yes, sir. Just recently, that is, last fall, I served in that capacity in a suit entitled Hall vs. Sears Roebuck & Company and Hall vs. Montgomery Ward & Company. The defense of those suits was provided by the Stewart-Warner Corporation, who manufactured the accused device.

Q. And what was the general subject matter of those suits?

A. They related to heating apparatus and the use with it of thermostat controls for controlling ignition and for controlling fuel to be supplied to the heaters. There also was involved the use of thermostatic apparatus for controlling circulating warm air fans and thermostatic apparatus designed to limit temperatures in the heaters.

Q. In that suit did you apply the prior art to the patents in suit?

A. Yes, sir, I did.

Q. And the claims?

A. Yes.

Q. Then you qualified as a patent expert in that suit, did you?

A. Yes, sir.

246 Q. You are acquainted, are you not, with the Freeman patent in suit here?

A. Yes, I am.

Q. When did you first learn about the Freeman patent, if you remember?

A. I would say my first intimate knowledge occurred immediately after the offering of a license involving that patent by the Minneapolis-Honeywell Heat Regulator Company to Mercoid.

Q. Did you then actively become associated with Mr. Moore in preparing evidence in defense of that patent?

A. Yes, sir.

Q. What was the first thing you did?

A. The first thing was to consider prior art that had been obtained by Mr. Moore in a validity search. Mr. Moore and I considered this prior art and discussed what we wished to use in this particular suit.

I also investigated the engineering department's records and the records of The Mercoid Corporation to discover literature and wiring diagrams and correspondence relating to heating systems of the Freeman type, and also the gathering of such Mercoid literature and bulletins pertaining to temperature controls employed in heating systems.

247 Mr. Moore: I offer in evidence a certified copy of the file wrapper and contents of the Freeman patent No. 1,813,732, here in suit, as MERCOID EXHIBIT TT.

(The file wrapper was so marked.)

Mr. Moore: I wish to call the court's attention to the fact that this application became allowed as filed.

I also wish to call the court's attention to the fact that the file wrapper and contents include an interference card, Interference 63,146, involving an application of David J. Jones and the Freeman patent, the decision of which the Examiner of Interferences found favorable August 21, 1933.

Mr. Freeman: That is, favorable to Freeman?

Mr. Moore: Favorable to Freeman.

Mr. Freeman: That is right.

Mr. Moore: The file wrapper and contents also include the declaration of the Interference 63,146 and the counts of the interference and the statement that count 1 is claim 2 of Freeman and count 2 is claim 5 of Freeman.

I also introduce in evidence a certified copy of the preliminary statement of Edward Freeman in this Interference No. 63,146 referred to in the file wrapper and con-

tents of the Freeman patent and also a copy of the decision of the Examiner of Interferences, dated August
248 21, 1933, referred to in the file wrapper and contents.

I wish to call the court's attention in this decision of the Examiner of Interferences to the latter part of paragraph 2 on page 4, in which the Examiner of Interferences states:

"It is considered that the evidence adduced on behalf of Freeman establishes a date of conception for him of both counts, a reduction to practice of count 1 as of no later than the end of January, 1929, and a reduction to practice of count 2 as of no later than the end of March, 1929."

I offer this certified copy as MERCOID EXHIBIT UU.

(The document was so marked.).

Mr. Moore: May it please your Honor, here is a book of the patent in suit and the patents that will be referred to by the defendant and also photographs of installations. (Handing instrument to the court.)

Q. Have you read this file wrapper and contents of the Freeman patent, Mr. Black?

A. Yes.

Q. And are you thoroughly familiar with the contents of it?

A. Yes, sir.

249 Q. I show you an enlarged photostat drawing of the Freeman patent in suit and ask you to explain very briefly to the court the purpose, construction and operation, as disclosed by Freeman, of this patent.

A. Freeman patent No. 1,813,732 relates to an entire system for heating a home, in which there is employed automatic means for accelerating combustion in a furnace and automatic means for circulating heat from the furnace to the rooms.

The patent includes thermostatic devices for controlling the operation of the apparatus controlling combustion as well as the apparatus for circulating the warm air.

Referring to Fig. 1 of the patent, the showing is made of a warm air furnace 10 in which coal is burned and an apparatus for controlling the rate of that burning is accomplished by means of dampers 15 and 16, the position of those dampers being controlled by a damper motor, electrically, indicated by the reference number 19.

In Fig. 2 of the patent drawing there is another form of apparatus shown for controlling the rate of combus-

tion, and that is a motor driven coal stoker indicated by the reference numerals 34, 35, 36, 37 and 38. The
250 only difference between these two figure numbers resides in the form of apparatus employed for controlling the rate of combustion.

In each of the figures there is shown apparatus for controlling the rate of the heating medium delivered to the rooms of the dwelling and it is represented by a motor operated fan 21 and 22.

The thermostatic apparatus for controlling the operation of the combustion apparatus, dampers or stoker, and the forced circulating apparatus, the motor operated fan, consists, as shown in the drawings, of three devices.

Located in one of the rooms of the dwelling is the room thermostat 18, which responds to changes in room temperature to place in operation the combustion controlling apparatus; referring to Fig. 2, the stoker and the circulating fan 21-22.

Located in the bonnet of the warm air furnace, such as shown in Fig. 1 and Fig. 2, are two thermostatic devices, one of which is intended to limit the maximum temperature which may be attained in the furnace when acceleration of combustion is taking place. That thermostatic apparatus is designated by the numeral 24.

For determining the time when forced circulation
251 of heated air in the furnace may take place, the second of these furnace thermostats, namely, 23, is arranged in the bonnet of the warm air furnace and connected to the circulating fan, so that only when temperatures are created in the furnace which may be determined suitable for distribution to the rooms to provide a heating and not a cooling effect, then the furnace fan thermostat 23 closes the circuit to the fan and places it in operation.

To briefly discuss or explain the electric connections provided between the combustion control apparatus and the circulating fan apparatus with the thermostatic controlling apparatus which determines the time that they operate, I should like to confine my explanation to an enlargement of Fig. 2 of the patent, which has the principal circuits involved indicated in red and blue.

The electrical arrangement of the stoker and the motor driven fan with the three pieces of thermostatic apparatus comprising the controlling means for the stoker and the fan gives this form of sequence of operation as exemplified in Fig. 2.

252 When the temperature in the room lowers below a desired degree, the room thermostat 18 will close its switch indicating that heat is desired in the room and if at this time the temperature in the furnace is low we will find that the switch in the limit control 24 will be closed, so that when the room thermostat closes its switch we will immediately establish the red circuit through the room thermostat 18, the closed limit switch 24 to the stoker motor 35, whereupon the stoker will operate and we will accelerate combustion.

This red circuit includes the supply of power from the supply line 25 through the wire 27, room thermostat 18, wire 29, furnace limit switch 24, wire 31, stoker motor 35, and thence by wire 33 back to the return side of the power supply 25.

As I have said, the temperature in the furnace is low at the time the room thermostat closes its switch and that temperature is low enough that the fan switch 23 is in open circuit position, the function of 23 being, as previously stated, to prevent the circulation of air that is not properly heated at the time the room thermostat demands that heat be supplied to the room, so that the room thermostat circuit indicated in blue through the fan switch, while this low temperature prevails in the furnace, 253 will not be closed.

However, through the continued energization of the red circuit, so that the stoker operates to accelerate combustion, there will then consequently occur a rise in temperature in the furnace, and when it reaches a predetermined degree such as suitable for circulation to the rooms, the fan switch 23 will then respond and close its switch, and we then establish the circuit as shown in blue.

The Court: Q. Your first assumption was that 23 showed the temperature in the top of the furnace? When the temperature in the room is low, the temperature in the top of the furnace would be higher than that and sufficiently high so that 23 would permit air to flow?

A. No.

Q. But that 24 was low enough so that it was not dangerous to operate; is that true? Is that your assumption? Or what was your assumption?

A. My assumption was that the temperature in the furnace—

Q. Give me your first assumption.

A. My assumption was that with a lowering in room temperature we could close the room thermostat circuit and a low temperature in the furnace—

254 Q. How low a temperature in the furnace?

A. I should say it would be 140.

Q. Does not this operate between 23 and 24?

A. Twenty-three—

Q. Those things operate between 23 and 24, do they not? How low is it in the furnace?

A. I should say a temperature of 140 degrees. I might apply temperature to each of these devices and—

Q. Give me the limits of those 23 and 24 devices.

A. Twenty-four will open its circuit when the temperature in the furnace reaches 300.

Q. On 24 what do you say is the top figure?

A. Three hundred degrees.

Q. And what is the low?

A. Two hundred and fifty.

Q. Give me the limits on 23 then.

A. It will close the circuit at 190 degrees.

Q. What is that, top or bottom?

A. That is top.

Q. And what is the low?

A. It will open the circuit at a low of 140 degrees.

Q. All right. Now, start out with your initial assumption and go through it again.

A. When the room thermostat 18—

255 Q. Well, give us some limits on the thermostats and then we will know where we are going. When does the thermostat open?

A. At 74 degrees. It reduces to—

Q. Seventy-four degrees?

A. Yes.

Q. That is when you want to obtain a room temperature of seventy-four?

A. Yes, sir. When the temperature in the room drops to 72 degrees the room thermostat will close its switch, and if a temperature prevails in the furnace 10, say, of 150 degrees we will find that the limit switch 24 is in closed circuit position, so that we may immediately establish the red circuit shown in the enlargement of Fig. 2, whereupon the stoker motor will be energized and there will occur an acceleration of combustion. With 150 degrees prevailing in the furnace at this time—

Q. Why did you put a lower limit on that 24?

A. What did I put there?

Q. Why did you put a lower limit on 24?

A. Each of the switches has to operate on a differential in temperature, or operate to do one thing, say, open its circuit at one temperature and there must then occur a change in temperature before the switch can return to
256 its original position. I have assumed that that will take place on a change of 50 degrees. But after we have opened the switch 24 at 300, there must then occur a lowering of temperature amounting to 50 degrees before the actuating mechanism can respond to restore the switch to closed.

Q. The temperature in the room drops to 72?

A. Yes.

Q. And then what happens? Then you assume a temperature of 150 degrees in the furnace?

A. Yes.

Q. Then what happens?

A. We find then that the switch 24 is closed at that low temperature and the red circuit is immediately established through the room thermostat 18 and the limit switch 24 to energize the stoker motor 35. Acceleration of combustion occurs then and we begin to raise the temperature in the furnace. At 190 degrees the fan switch 23 will close its switch.

Q. Well, was the fan operating?

A. The fan is open on a drop in temperature to 140 degrees. It won't close until we—

Q. No, we had a temperature of 150 in the furnace and the fan was blowing then, was it not?

257 A. Not unless there had been a previous rise in temperature to 190 degrees.

Q. I see. Then you don't know that. You just assume it was not working at all? You just assume the fan was not working?

A. We may have a case where the temperature had not operated—

Q. Understand, I am just trying to learn about this.

A. Yes.

Q. We assume a temperature of 150 in the furnace; 150, of course, is between 140 and 190.

A. Yes.

Q. And you say you don't know whether it has been

up to 190 and you do not know whether it had been so or not and you assume it had not been so?

A. Yes.

The Court: All right.

Mr. Moore: Let me ask a question there.

Q. What is the normal position of that switch 23?

A. The switch is normally open. It must be subjected to 190 degrees in temperature in order to close.

Q. Then the fan is not operating unless the 23 is closed, is that correct?

A. That is correct.

258 Q. So then on your assumption in starting and closing your room thermostat the circulating fan is not operating, is that correct?

A. That is correct.

The Court: Q. Unless the temperature has been where?

A. Unless the temperature has risen to 190 degrees to close the switch and has not fallen to 140.

Q. And has not thereafter fallen to 150?

A. I beg your pardon?

Q. And has not thereafter fallen to 140?

A. Yes.

Q. So you didn't know whether it had ever been up; when you started out you didn't know whether it had ever been up to 190, is that it?

A. That is right.

Q. You assumed it was not open?

A. Yes, sir.

The Court: All right.

Mr. Moore: Q. You had assumed that the furnace had been idle for some time, hadn't you, and when closed the room thermostat—

The Court: I am not quarreling with his assumption. I just want to know what he is doing.

Mr. Moore: Yes.

259 The Witness: So with the red circuit established and the acceleration of combustion occurring a rise in the heating space of the furnace 10 will take place, and at 190 degrees the fan switch 23 will close, thereby establishing the circuit shown in blue from the room thermostat 18 through the fan switch 23 to the fan motor 22 and back to the power supply.

The Court: Q. Thereupon the fan starts?

A. Yes, sir, and air is circulated to the room.

When the room temperature reaches 74 degrees, the thermostat 18 will open its switch and since power being supplied to the red and blue circuits, must first pass through that switch it immediately stops both the operation of the stoker and the operation of the fan.

Now, there are circumstances when the red and blue circuit is closed in response to a call for heat by the room thermostat 18 or there may arise a temperature in the furnace to the 300 degrees, setting of the limit switch 24 and the arrangement provided in this circuit is such that if a temperature of 300 degrees is reached within the furnace, the limit switch 24 will open its switch, thereby interrupting the flow of power through the red circuit and stopping the stoker motor, whereby combustion will be checked.

260 Q. That is, the furnace temperature gets to 300 before the room temperature gets to 74, is that what you are saying?

A. Yes, sir.

Q. All right.

A. Under that condition with the room thermostat still below 74 degrees and a high temperature in the furnace, the blue circuit remains completed, so that the fan continues to circulate that hot air after the stoker motor has been shut down as a result of the limit switch 24 opening at 300 degrees. That fully covers the two sequences of operations that are occurring.

Q. Starting in on that assumption. Start and go around again. I want to see where you start.

A. The room thermostat—

Q. Start on the basis of facts that you have now.

A. The room thermostat at 72 degrees closes its switch.

Q. It drops down to 72, or where was it?

A. At 72 degrees.

Q. It drops down to 72?

A. Yes.

Q. Then what happens?

A. It closes its switch and with this low temperature, 150 or lower in the furnace 10, switch—

261 Q. It has been to 150. You said 300. You had 150 in there. And there you had 300.

A. I may have misunderstood your Honor.

Q. In other words, go on and show me how this thing operates the next time it goes around on the basis of where

you have reached, not on the same old basis that you started on, but on the basis of where you reached.

A. Under a condition where 300 degrees—

Q. Just go on and show me the operations, assuming some changes.

A. We have seen that the 300-degree temperature within the furnace has stopped operation of the stoker, because limit switch 24 opened its circuit, but that the blue circuit, through the fan switch 23, remained closed. Now, as the temperature, since we have stopped combustion, lowers in the furnace to 250 degrees, the limit switch 24 will reclose its circuit, thus reestablishing the red circuit to the stoker motor and again accelerating combustion.

Q. When did that fan start after that operation?

A. The fan has been running.

Q. All the time?

A. All the time, yes, sir. So upon reclosing the limit switch 24 at 250 degrees the stoker is again placed in
262 operation to accelerate combustion. If on this acceleration of combustion the temperature of the room has been raised to 74 degrees, then the room thermostat 18 will open its switch and cut off the supply of power to the red and blue circuits to stop the stoker operation and stop the fan operation.

Mr. Moore: Q. And that is the normal operation, and then it will recycle again when the room thermostat calls for heat, is that right?

A. Yes.

The Court: Q. It will recycle exactly the same way, if you have the same conditions in the furnace?

Mr. Moore: Yes.

The Court: Q. Won't it?

A. Yes.

Q. Otherwise it may not?

A. That is right.

Mr. Moore: An enlarged photostat of Fig. 2, the Freeman patent, with the circuits shown in colors is offered in evidence as a physical exhibit, as MERCOID EXHIBIT VV.

(The document was so marked.)

Mr. Moore: Q. Now, on this same patent does the specification patent describe any particular type of room
263 thermostat 18?

A. No, sir, it does not. The reference to the ther-

mostat 18 is spoken of more or less just by the term "Thermostat."

The Court: Q. Do those room thermostats ordinarily operate on two limits, upper and lower limits?

A. Oh, yes, it takes a difference in temperature to throw a switch from one position to another.

Q. How much difference?

A. It will run from—it will depend on the type of thermostat—from a half of a degree to possibly two, three or four degrees, depending upon the type of construction of the article.

Mr. Moore: Q. Does the specification of the Freeman patent describe any particular type of switch 23 you have referred to as a fan switch?

A. No, sir. It just by word description defines what the article designated in the drawing 23 is. I quote from page 1 of the patent, column 2, line 88:

"The switch 23 is of a type which closes its circuit only when a predetermined temperature is exceeded. This temperature is so chosen that the circuit within the switch 23 is only completed when the furnace hood has been heated to a temperature greater than normal room temperature."

264 The Court: Let us take a short recess now.

(A short recess was here had after which the proceedings were resumed as follows:)

The Court: Proceed.

The Witness: Continuing my quotation from the patent:

"Thus the fan 21 will not be operated if the furnace has not reached a temperature at which the air would be heated above room temperature. In other words, the fan 21 can never operate to force unheated air into the rooms to be heated while this control is in operation."

Mr. Moore: Q. Does the patent define any particular type of control identified as No. 24?

A. No, sir. In the same way as the thermostat 23 was referred to, so is 24, and I read from page 2 of the patent, column 1, line 6:

"The switch 24 is of the type which opens its circuit when a predetermined temperature has been exceeded. This temperature is so chosen that the circuit within the switch is open when the furnace has been heated to such a point that further heating might prove dangerous."

Q. Is there any reference in the specification for any other use of the fan motor which is not illustrated upon the drawing?

A. Yes, sir. I shall read from page 2, first line of column 1:

265 "For summer use, however, where the fan 21 is to be used for ventilating, suitable electric circuits are provided for short circuiting the switch 23 to permit operation of the fan 21 regardless of the furnace temperature."

While the patent makes this statement, there is no showing by way of wiring in the drawings to accomplish the results set forth.

Q. I believe the specification makes a reference to other variations in details in the invention. Are there any examples given in the specification as to those variations in details?

A. Rather briefly referring again to page 2, column 1, line 49, this statement appears:

"Other variations in the details of the invention are possible without departing from the broader features thereof. For example, the wiring shown herein is the so-called 'two wire system.' With several commercial types of damper controllers and thermostats, a 'three wire system' is used. Such controllers and thermostats may be used as a part of the apparatus for carrying out the invention and the same may be connected by wiring analogous to that shown herein."

This statement refers to such variations in circuit arrangements to accommodate the different types of controls. That is all the reference that is made. There is

266 nothing shown in the form of wiring diagrams, and I assume Mr. Freeman felt it was within the power of those skilled in this art to accommodate the other types of controls to his system.

Q. What fuel is illustrated in the Freeman patent drawings?

A. Both Fig. 1 and Fig. 2 illustrate a furnace in which coal is employed as a fuel to be burned.

Q. Is there anything in the specification which indicates any other type of fuel might be used?

A. Yes, sir. I quote from page 2, column 1, line 46:

"By similarly applying the above described apparatus to the fuel supply system of an oil or gas fired furnace, the same may be controlled in exactly the same manner."

Q. I believe you stated when you were first employed in Mr. McCabe's department, this particular department developed and created control devices that the Federal Gauge Company manufactured, did you not?

A. Yes, sir, that is correct.

Q. What was the business of the Federal Gauge Company in 1925?

A. They were engaged in the business of supplying the heating industry with thermostatic and pressure-responsive electric switches, and to name a few I would say they sold in those days devices of the kind defined in the Free-
267 man patent and indicated at 18, room thermostats. They also sold in those days, that is, 1925 and prior thereto, thermostatic devices of the kind defined in the Freeman patent as 23 and 24, those devices being sold for the purpose of serving, 24, a limit control, to prevent excessive temperature in the furnace and also as a fan control to delay the operation of the fan until the furnace was heated.

Q. Does the Mercoid Corporation at the present time continue to manufacture and sell such controls?

A. Yes, sir, they do.

Q. In this particular case did you make any search of the records in McCabe's department as well as in Mercoid's department for specimens of the early room thermostats sold by Federal and the early temperature and pressure-responsive devices that you have just spoken of?

A. Yes, sir, I did, and I found such articles.

Q. Can you produce one of the thermostats which were being made and sold in 1925?

A. Yes, sir. I have in my hand such a thermostat, which was sold by the Federal Gauge Company prior to 1925. This is the article represented by the reference numeral 18 in the patent drawing of Freeman.

Q. Will you explain very briefly the construction
268 and operation of that thermostat and the mercury tube switch that is employed therein?

A. This control consists essentially of three elements, the first of which is an element located at the bottom of the control, termed a bellows. It is a sealed hollow element, corrugated much in the fashion of, shall I call it, the wind box of an accordion, and in this element is sealed a volatile liquid, so that as the element takes on heat this liquid will be caused to expand and the expansion of the

corrugated sections will cause a swelling up of the element and as the temperature recedes, the bellows will contract. That serves as a temperature-responsive element by means of which we can transmit power to operate a switch.

Located at the top of the instrument is a sealed mercury switch. This switch, of which I have a separate sample, is an elongated tube, having sealed at one end a pair of electrodes, contacts, and sealed within the tube is a body of mercury, so that if we lower the end of the switch containing the contacts the mercury flows down and immerses those two contacts, thereby completing a circuit through the switch, if power is being supplied to the switch, and by reversing the inclination of the tube to raise the contact the mercury flows to the opposite end, disengag-
269 ing the two contacts from the mercury to open the circuit through the switch. The mercury switch then is the second of the three elements comprising this thermostat.

The third is an instrumentality connecting the thermal power element with the tilting mercury switch so that as the temperature, we will say, rises to 74, as we previously said, there will then occur an expansion of the bellows sufficient through the mechanism to tilt the switch and open the circuit, and when the temperature in the room declines to 72, where the temperature of the element becomes 72 degrees, then the contraction of that element will take place and through the mechanism cause the mercury switch to move to close the circuit through the switch.

Q. Is that adjustable?

A. Yes. I should have mentioned that associated with the mechanism, the third of the three elements I refer to, is an adjusting lever, which is moved over a calibrated scale, so that a person may move it to this 74 degree setting that you wish to maintain in the room, and the switch then will operate at 74 degrees to open the circuit, and upon the drop in temperature of 2 degrees, which in the trade is called the differential, a differential or dif-
270 ference in temperature necessary to throw the switch from one position to the other, and you have this 2 degree differential or drop in temperature to 72 degrees, then the switch would open the circuit.

Q. Could you demonstrate to the court by setting that certain setting and then applying heat to the bellows?

The Court: Oh, I understand that.

Mr. Moore: You understand that? All right. . .

Q. Now, in making this investigation for this trial, I understood you to say that you had found various wiring diagrams showing the application of the Mercoid devices. In making the investigation, did you find any such wiring diagrams as published by the Federal Gauge?

A. Yes, sir, I did.

Q. I show you here Mercoid Bulletin D, a photostat of which has been marked for identification as Mercoid Exhibit U, and ask you if that is the first publication you found showing a wiring diagram?

A. Yes, sir. Referring to this bulletin, 1924, marked for identification U, at the bottom of the first page is a wiring diagram bearing the legend below it, "Typical wiring layout on oil burner."

Q. What is illustrated in that diagram designated 271 as Mercoid room thermostat?

A. That is the thermostat to which I have just referred and which I just described.

Q. And what is the instrument to the right of the thermostat?

A. That is designated in the diagram as Mercoid steam pressure switch or Mercoid temperature control and is a device serving as a limit device in the first instance in a steam pressure heating system, and in the second instance as a temperature control limit device on a hot water heating system.

Q. Now, on the back or rear sheet of this bulletin there are two illustrations of this Mercoid pressure control and Mercoid hot water boiler control, are there not?

A. Yes, sir.

Q. Can you produce one of these Mercoid hot water boiler controls, such as illustrated in this bulletin?

A. Yes, I can.

Q. That instrument you have in your hand now, was that one of the instruments that Federal Gauge was making when you first entered the employ of McCabe?

A. Yes, sir.

Q. Did you find any other earlier bulletins of the 272 Mercoid Corporation which illustrate and describe that particular room thermostat that you have just referred to?

A. Yes, I did.

Mr. Moore: I have a photostatic copy of Mercoid Bulletin E of 1924 which I will ask to have marked for identification as MERCOID EXHIBIT V.

(The document was so marked.)

Mr. Moore: Q. Is this Mercoid Bulletin E dated June, 1924, the bulletin you referred to as illustrating and describing the Mercoid room thermostat?

A. Yes, sir. The likeness can very readily be seen from the illustration in the bulletin upon comparing it with the physical exhibit I just described.

Q. That is the illustration of Fig. 21?

A. Yes, sir.

Q. Now, referring to page 2 entitled "Mercoid Federal Boiler Controls"—

Mr. Freeman: Do we have copies of those so we might be able to follow them?

Mr. Moore: I thought you did. Didn't I give them to you? I will have to give this to you when I get through with it.

Mr. Freeman: All right.

273 Mr. Moore: Q. On page 2, under immersion type of boiler controls you find the straight stem temperature type illustrated?

A. Yes, sir.

Q. That is the same as the instrument you produced there?

A. Yes, sir; the illustration carries the identification mark Fig. 36. This mark, also type number, also appears on the name plate of this physical exhibit.

Q. Now, on the back under the heading "Federal Mercoid Furnace Control," there is a Fig. 50 illustrated. Can you produce one of those instruments?

A. Yes, sir, I can.

Q. Now, is there any difference in the operation between the Fig. 36 temperature boiler control, and the Fig. 50 Mercoid furnace control?

A. The Fig. 36 boiler control, which I have in my hand, and which is shown on page 2 of the exhibit marked for identification as Mercoid Exhibit V, is a temperature-responsive instrument to hot water serving generally as a limit device. The other article, the Fig. 50 control, is also a temperature-responsive instrument, and it is intended to respond to air temperature changes to serve as a limit control; although the function of both 36 and 50 is

274 the same, and their construction is the same, the difference being only in the form that the thermo or temperature-responsive element takes.

The Fig. 36 has a temperature bulb which contains a liquid like that shown in the Fig. 21 thermostat connected directly to the casing, whereas in the Fig. 50 control a thermal element containing the volatile liquid is connected by a piece of remote tubing so the control instrumentality may be mounted some distance from the point where the thermal element is subjected to the temperature changes.

In the application of a Fig. 50 control to a warm air furnace, such as exemplified in the Freeman patent, the instrumentality would be supported by means of the bracket that one sees attached at the bottom of the control to a wall or some support adjacent to the furnace, and the thermal element which resembles something of a trombone, and the sleeve of the trombone is inserted into the dome of the warm air furnace at a point such as is shown for the insertion of the limit switch 24 in the Freeman patent.

Q. I call your attention to this Fig. 36 which you have on the desk. Is there a name plate on that Fig. 36?

A. Yes, there is.

275 Q. Do you find any patent numbers?

A. Yes; the patent Nos. 1,734,015 and 1,734,016 appear on this plate.

Q. Could you explain the internal operation of that Fig. 36 and the mechanism of the Fig. 50 from an enlargement of the patent No. 1,734,015, which is referred to on that name plate?

A. Yes, sir, I could. Referring to Fig. 1 of the McCabe patent 1,734,015, we have an instrument comprising practically the same three elements that were found in the room thermostat previously referred to.

As the power element of the switch Fig. 1, there is employed a different form comprising what is known as a Bourdon tube, which is a hollow cylindrical element that is flattened into the form of a "C." The reference numeral 2 in the drawing applies to this element. This Bourdon tube element has one end, that is, as shown in the lower end of the drawing, fixed to a fitting at the bottom of the casing; and the fitting is provided with an opening into the interior of the Bourdon tube 2. The free unsecured end of the Bourdon tube is sealed off so if the pressure medium enters through the fitting into the interior of the Bourdon tube it will have a tendency to flex and

move outwardly the free end of the Bourdon tube to-
276 ward the casing, and as the pressure recedes in the Bourdon tube, there will then occur a contraction of the "C" member of the Bourdon tube so the free end moves away from the casing.

In a steam pressure application we would rely upon the pressure of the steam to cause the movement of the Bourdon tube. If this apparatus were intended to respond to temperature changes such as in the Mercoid Fig. 50 control, there would be connected to the fitting at the lowermost portion of the casing the thermal element and this tubing containing the volatile liquid, so that upon temperature changes the expansion of the liquid or contraction, as the case may be, would likewise have a corresponding pressure change in the Bourdon tube. So that on a rise in temperature the Bourdon tube would be subjected to pressure so that the free end would move outwardly toward the casing 1, and on temperature fall, and corresponding temperature drop in the thermal element, the pressure would be relieved at the Bourdon tube and the Bourdon tube would move away from the casing towards the center of the instrument.

This instrumentality Fig. 1 includes, as did the room thermostat, a mercury switch. In this instance instead of operating one as in the room thermostat, there are
277 shown two mercury switches, both bearing reference numerals 13.

As a third element in this instrumentality we have what is referred to generally by the reference numeral 13 an actuating mechanism connecting the free end of the Bourdon tube to the tiltable mercury switch. So on a pressure or temperature rise the switches can move to one position, and when temperature or pressure falls be restored to its original position.

The arrangement of the mercury switches 13 represented in the Fig. 1 is such that on a pressure rise or temperature rise, one switch will be open and the other closed, and upon a temperature or pressure fall the switch in the open position will be restored to its closed position and the switch in the closed position be restored to its open position.

Mr. Moore: A copy of the McCabe patent No. 1,734,015, to which the witness has just referred, is offered in evidence as MERCOID EXHIBIT WW.

(The document was so marked.)

Mr. Moore: Q. Now, Mr. Black, did you find disclosed

in Fig. 1 of this patent a unitary structure including at least a switching means for controlling not less than two circuits?

278 A. Yes, sir, I do. I find herein a single unit represented by Fig. 1 including a switching means comprising not less than two circuits, which in this case is two circuits, namely, switch 13 and a switch bearing a like reference 13 below it.

Q. And operated by temperature-responsive means, responsive to the temperature of a heating device, or of a fluid medium heated thereby?

A. Yes, sir.

Mr. Bair: That is just a bit leading.

Mr. Moore: I am reading the definition given in the license upon which Minneapolis-Honeywell wanted Mercoid to pay a royalty.

The Witness: Yes, sir, I find that the switching medium, namely, 13 13 is responsive to a temperature change affecting expansion of the Bourdon tube to actuate the switches.

Mr. Moore: Q. Is one of those circuits being established on temperature rise and another being established on temperature fall?

A. Yes, sir. As shown in Fig. 1 the upper switch is illustrated in the open circuit position and the lower switch 13 is illustrated in the closed circuit position, so that upon a temperature rise the Bourdon tube will expand and

279 actuate the switches, whereby the upper switch 13 is moved to a closed position and the lower switch 13 moves to an open circuit position.

Mr. Freeman: Q. Simultaneously?

A. Yes, sir.

Mr. Moore: Q. Does that structure have permanent internal wiring connecting the switching means to terminals for the connection of external wires thereto?

A. Yes, sir. Mounted in the casing at its top are illustrated two sets of terminal posts designated as 14. In the interior of the casing there are connections from these binding posts to the contacts of the two switches 13; the upper switch being connected internally by these wires to the right hand pair of binding posts 14 and the lower switch connected by internal wires to the left hand pair of binding posts 14.

Q. Have you a copy of the McCabe patent?

A. Yes, sir.

Q. Can you refer to any part of it for the authority for the statement you have just made?

A. Yes, sir. I am quoting from page 2 of the patent, column 1, as follows:

"As shown in Fig. 1, there are two carriers in the present embodiment the poles of each being at the opposite
280 sides of the tubes, that is, one set of terminals will be to the right and the other to the left. These are connected suitably to binding posts 14 to which may be connected any desired instrumentality which the circuit controlling devices are to govern. Any large variety of uses is accommodated by this arrangement, as various forms of circuit controlling devices may be inserted in the carriers and by arranging the terminals in different positions a large range of uses is possible. In the present embodiment, when the carriers are in the position as shown in Fig. 1, the upper circuit control device is in open position and the lower one is closed. Movement of the carriers in the opposite direction from that shown will effect just the opposite result."

281 Q. When the adjournment was taken this morning you had described the operation of the Mercoid room thermostat and the furnace control, such as illustrated on Mercoid Bulletin D, data sheet No. 1, marked for identification Mercoid Exhibit U. Now, referring to the wiring diagram on the first page thereof, that illustrates a hook-up of the Mercoid controls in an oil burner, does it not?

282 A. Yes, sir.

Q. Do you have any technical name for that kind of a hook-up? In other words, how are these instruments connected in circuit?

A: This wiring diagram illustrates the use of a room thermostat and a Mercoid temperature control acting as a limit switch in a series circuit arrangement, that is to say, there is a sequence, a series of devices through which the current must flow from one to the other before it reaches the apparatus controlled.

Q. Do you have the same type of series hook-up in the Freeman patent?

A. Yes, sir. There is reference in claims 9 and 10 of the Freeman patent to "said circuits in series connection," such an arrangement being, in the case of a room thermostat, shown in the diagram Mercoid Exhibit U in the Freeman patent, and the limit control shown in Mercoid Exhibit U in the Freeman patent, a series connection to the

motor, so that the current or power or energy to the motor must flow through the room thermostat and then through the limit control to the motor. Both of those switches must be in closed circuit position for power to be supplied to the motor. Either the room thermostat or the limit
283 switch independently of the other, however, can stop the supply of power to the motor.

Q. You also referred to the McCabe patent as illustrating the use of two switches within the casing. Have you now found any literature of the Mercoid Corporation which illustrates the Fig. 36 or the Figure 50 controls, which you have produced, which shows the use of two switches within the casing?

Mr. Freeman: Mr. Moore, do you happen to have a copy of McCabe patent 1,734,015 that we might use?

Mr. Moore: Yes, I think I have.

Mr. Freeman: It has been referred to here for the first time, so far as I am concerned.

Mr. Moore: I think I have. Wait a minute.

Mr. Freeman: I like to know what the witness is talking about.

Mr. Moore: I will share it with you.

Mr. Freeman: I might ask the purpose of this patent, as long as it is coming in here for the first time.

Mr. Moore: It shows in Figure 1 the—

Mr. Freeman: What is it pleaded for, or what are you referring to that has not been pleaded showing the state of the art?

284 Mr. Moore: It has been introduced in evidence, and I think it is also set up in the prior art, and it is introduced to show that in 1922 McCabe filed an application on a unitary control structure that had a switching means of not less than two circuits which were operated in response to the temperature within a heating medium and one closed on a rising temperature and the other open, having internal binding posts which were adapted to be connected in outside circuit.

Mr. Freeman: I am not asking you to describe the patent. Can you tell us whether you are using it to show the state of the art, or an anticipation, or what.

Mr. Moore: I am just telling you, to show what I am using it for, which is to show that it has all the elements; a combination control on which they wanted Mercoid to pay a royalty, and that was on the market and was filed in

1922. Now, you may consider that an anticipation or prior art, or whatever you want.

Mr. Freeman: If it is an anticipation, it hasn't been pleaded and we object to it for that reason.

Mr. Moore: The patent speaks for itself.

The Court: It may stand subject to the objection.

Mr. Moore: It has been introduced in evidence as Exhibit WW.

285 The Court: Is it in this book of prior art?

Mr. Moore: Yes, it is the McCabe patent, the first one.

The Court: Yes, I saw it in this book of prior art.

Mr. Moore: Yes, it is there.

The Court: The second one.

Mr. Moore: The second one.

The Court: Freeman is first and then McCabe.

Mr. Moore: Now, will you please read my last question?

(The question was read by the reporter as above recorded.)

The Witness: A. Yes. In Mercoid Bulletin E-3, marked for identification Mercoid Exhibit W, there is illustrated on the first page, the upper left, the figure 36-L, in which there appears two mercury switches, one arranged to open the circuit on a rise in temperature, and the other to close the circuit on a rise in temperature.

To the upper right is shown the figure 37-L, which also illustrates the use of two mercury switches, and at the lower left of the sheet the figure 31-L, showing two mercury switches.

On the back page, under the title, "For Automatic
286 Control on Warm Air Furnace," is shown the figure 50-L, with two mercury switches within the casing.

Mr. Moore: Q. That is the bulletin dated April 24, 1926, is it?

A. Yes, sir.

Q. Have you searched the records of the McCabe department of the Mercoid Corporation for any bulletins or wiring diagrams showing the use of the Mercoid pressure or temperature control in connection with the use of a warm air control in a heating system?

A. Yes, sir.

Q. What did you find?

A. I found a tracing bearing the drawing number 266. The title appearing on this drawing in the title space at

the lower right states, "Wiring Diagram of Oil Burner Heating System with Warm Air Furnace Fan."

Q. Who made that tracing, do you know?

A. I made this tracing, as indicated by my initials in the space marked, "Drawing," in the lower right of the drawing, the initials being F.R.B., and opposite the initials appear the date upon which I made the drawing, 9-27-27.

Q. And those entries are made in your own hand-
287 writing, are they?

A. Yes, sir.

Q. And where did this tracing come from?

A. This tracing came from the tracing file of Mr. McCabe's engineering department.

Mr. Moore: A blue print of tracing No. 266 is offered in evidence as MERCOID EXHIBIT XX.

(The blue print was so marked.)

Mr. Moore: Q. I ask you to refer to this enlarged photostat of drawing 266, which illustrates the circuits in color, and please briefly trace the same for the court.

A. This drawing discloses combustion apparatus in the form of an oil burner having a burner motor, so indicated by the term "burner motor" in the drawing, and circulating apparatus for circulating warm air having a motor indicated by the word "fan" in the drawing.

There is also shown electrically connected to this apparatus three thermostats, the first bearing the designation, "Mercoid Thermostat," which is a room thermostat; the second at the upper left of the drawing designated as "Mercoid Steam Pressure or Temperature or Furnace Control," being the limit control, and as of the date of the drawing, such a furnace control would have been the article
288 manufactured and sold by the Federal Gauge Company, namely, the figure 50 control.

Below that is the third thermostatic control designated as "Mercoid Warm Air Control," and as of the date of the drawing, 1927, that also would have been the Mercoid figure 50 control, in which case, as indicated in the drawing, the switch would assume a reverse position to that shown in the limit control at very low temperatures.

Since the limit control, Mercoid furnace control, opens its circuit on a rise to a high degree, 300 degree temperature, the switch assumes the opposite position in the warm air control, because upon a rise in temperature it closes its circuit, namely, at 190 degrees.

Now, the electrical connections between the thermostats

and the combustion and circulating apparatus provide this form of operation: With low temperatures prevailing in the furnace such as, for example, below 140 degrees, and the temperature drops to, let us say, this 72 degrees in the room, the room thermostat will close its switch, and with that low temperature in the furnace we will find the limit control in closed circuit position, so that the red circuit 289 is immediately closely to the burner motor to accelerate combustion. While the temperature is at this low 140 degrees in the furnace, the fan switch will be open so at this time we cannot energize the fan motor. With combustion occurring the temperature in the furnace will rise. At 190 degrees, for example, the Mercoid warm air control, controlling the fan, will close its circuit and we thus will then have the establishment of the blue circuit from the room thermostat to the apparatus which controls and operates the circulating fan.

With the circulation, forced circulation of the air to the room, raising the room temperature to 74 degrees, the room thermostat will open its circuit and stop both operation of the burner motor and the circulating fan, whereby we will check combustion and check the circulation of the warm air. In the event under some circumstance the warm temperature in the furnace, while the burner and the fan are running, will rise to this predetermined temperature of 300 degrees, the Mercoid furnace control will open its switch, thus interrupting the red circuit and stopping the burner motor, and likewise in this instance the blue circuit would likewise be interrupted to stop operation of the fan motor.

That describes the sequence of operation obtained 290 with the thermostatic apparatus and the combustion and circulating apparatus shown in drawing 266.

Q. What is the difference in sequence to the operation you have described and that shown in Figure 2 of the Freeman patent with the colored circuits, Mercoid Exhibit VV?

A. Did you ask for the difference?

Mr. Moore: Read the question.

(The question was read by the reporter as above recorded.)

The Witness: A. The difference resides in that the limit control, as exemplified in Figure 2 of Mercoid Exhibit VV, when it opens its circuit stops the stoker motor and permits the fan to continue operation so long as the room thermostat remains closed, and the temperature closes the furnace control 23. However, there is a—

The Court: Will you state that again?

The Witness: The difference—

The Court: Will you state that again, and speak very accurately, will you?

The Witness: The difference resides in Freeman, shown in Mercoid Exhibit VV, when the limit control 24 opens its circuit at 300 degrees temperature it stops operation
291 of the stoker motor but permits operation of the fan to continue. In the drawing No. 266, Mercoid Exhibit YY, when the limit control opens its circuit at 300 degrees it will stop operation of the burner motor and the fan. There is, however, this similarity between the Freeman arrangement and the arrangement of drawing No. 266, as claimed by Freeman, in that in Freeman when the temperature in the furnace is at a very low state, below 140 degrees, and the room thermostat upon a drop in temperature to 70 degrees closes its circuit, there first occurs only the establishment of the red circuit initating operation of combustion; closure of the blue circuit is delayed by reason of the fact that the fan switch 23 at 140 degrees is open. We find the same in drawing 266, Mercoid Exhibit YY, with low temperatures prevailing in the furnace below 140 degrees, when the room thermostat closes its switch, the red circuit will be immediately established to the burner motor. The blue circuit, because of 140 degrees temperature in the furnace, cannot be completed because the fan switch Mercoid warm air control is open so that it delays operation of the fan.

In both Freeman and drawing No. 266, when continued combustion raises the furnace temperature to, let us
292 say, this 190 degrees, then, in both instances, Freeman and drawing 266, the blue circuit is completed and the fan at that time may operate to force the warm air to the room.

Another similarity that rests with both of them is this: that when the room temperature, as a result of bringing this air from the furnace to the room, rises to 74 degrees, the thermostat in each of these arrangements will operate to open the circuit, whereby it will stop the supply of power to both the motor and the fan.

Now, the similarity that I have pointed out between Freeman and drawing No. 266 is that similarity that is defined by some of the Freeman claims.

Mr. Moore: Q. The difference, as I take it, then, is that in the—

The Court: What claims do you have in mind? Do you have the claims?

The Witness: Yes, sir. Claim 2, claim 5, claim 7 and claim 10. That is to say, that in those claims we do find all of the elements specified therein embodied in the diagram No. 266, Mercoid Exhibit YY.

The Court: How many possible circuits do you have in *the wiring system disclosed in drawing No. 266?*

293 The Witness: We have two circuits.

The Court: Two possible circuits?

The Witness: Well, you can modify this by changing a wire from one—

The Court: No, I mean as it is made, by means of opening and closing switches.

The Witness: I would say there are two circuits controlled, the red and the blue.

The Court: How many circuits in Figure 2 of Freeman?

The Witness: There also are two circuits, the red and the blue.

The Court: How many possible circuits?

The Witness: Well, that is all I see, your Honor, unless we begin to disconnect wiring and attach them somewhere else; just two circuits.

The Court: No, just opening and closing switches as the system is designed to work, how many possible circuits are there? Just two?

Mr. Moore: Just two, yes, your Honor.

The Witness: I would like to say this: There are two circuits in each, and of the three thermostatic devices employed, one has control over both circuits. If I may explain that, we have a red circuit and a blue circuit in each.

Controlling the red circuit is the limit control. Con-
294 trolling the blue circuit is the fan control. Controlling both circuits is the room thermostat control. It is in both the red and the blue circuit.

The Court: Is the same true of the other?

The Witness: Yes, sir.

The Court: Just exactly the same?

The Witness: As to the circuits and number of devices, yes, sir. I pointed out the differences.

The Court: As to the circuits?

The Witness: Yes, there are still two circuits. I did point out to your Honor where the differences in sequence of operation were and where the similarities were.

The Court: What is the difference, sequence of operation?

Mr. Moore: Your Honor, I think that resides in the location of the limit control in the red circuit. In the Freeman patent the circuit is completed from the room thermostat through the limit control, and in drawing 266 the circuit is completed first through the limit control and then through the room thermostat, and that causes a different sequence.

The Court: All I am trying to do is to find out what is the differenee. What is the cause of the difference?

295 The Witness: It is the location in the circuit of the limit control, whether the limit control functions only to control the burner, as specified in some of the claims, or whether the limit control may be positioned in the circuit so that it controls both the fan and the burner.

The Court: All right, go ahead.

Mr. Moore: The enlarged photostat of drawing 266 with colored circuit is offered in evidence as a physical exhibit, MERCOID EXHIBIT YY.

(The photostat was so marked.)

The Court: Now, maybe I misused the word "circuit." I do not know a great deal about this, you know. I am just trying to learn.

The Witness: Surely.

Mr. Moore: Your Honor, I think that the main difference between the two can be explained very easily. By locating the limit control in the position it does in the Freeman patent allows the fan to operate after the limit control has shut off the burner, then the fan will blow the latent heat out of the dome of the furnace before it shuts down.

The Court: You know, in my simplicity I would have thought there would have been another circuit operat-

296 ing that; in my simplicity.

Mr. Freeman: The limit switch is independent of the fan switch.

Mr. Moore: In the Freeman patent.

Mr. Freeman: And that is not true of the 266 drawing. Thus you get a different sequence of operation.

297 The Court: All right, go ahead.

Mr. Moore: Q. Now, you have referred to certain claims of the Freeman patent in connection with this drawing. The witness has testified that he is a patent expert and is familiar with these claims. Now, I ask him to point

out on 266 drawing wherein he finds as recited in claim 2 of the Freeman patent a furnace control—

Mr. Freeman: Is the witness an engineer, also, Mr. Moore, an electrical engineer or engineer?

Mr. Moore: He hasn't so testified, except that he has made all these wiring diagrams and has been in this business for sixteen years, and has had all the electrical experience, possibly more practical electrical experience.

Mr. Freeman: So we could call him a man skilled in the art in about 1930?

Mr. Moore: No, because he entered the employ of Mercoid five years before that. It doesn't take a man five years to become skilled in the art if he deals with it every day as his bread and butter.

Mr. Freeman: So he was a man skilled in the art, then, prior to 1930.

Mr. Moore: At the time he made this drawing, I would say he was skilled in the art, in 1927.

Mr. Freeman: That is what I want. I want him
298 qualified both as an expert and as a man skilled in the art.

Mr. Moore: He is that mythical person you referred to, your Honor.

The Court: What is that mythical person?

Mr. Moore: Mr. Freeman gave a definition of him in his opening address.

Mr. Freeman: Would you like to have it repeated, your Honor?

The Court: I would like to hear it now.

Mr. Freeman: I think a man skilled in the art, as I have heard this court say, is someone that has had the ordinary primary training and has had some secondary training, such as some college work,—in this particular field I would say some electrical work, not necessarily a college graduate, but a man who has had the fundamentals of electrical engineering or electrical characteristics or what might be brought about in the use of electrical apparatus, and then taking that school education and going along three or four or perhaps five years in the given field so that he not only has what we call theory on the one hand, but some of the practical knowledge where he gets some of the education in the actual plant, and when he has that, coupled with his fundamental or school training, I
299 would say he then for the first time was qualified as a man skilled in the art.

Mr. Moore: I agree with that definition, your Honor, except I believe the schooling a man should have should be the schooling of experience.

The Court: Oh, it does not make much difference what kind of schooling it is.

Mr. Moore: As long as he knows his subject.

The Court: I should think so.

Mr. Moore: Q. Now, Mr. Black, I asked you, as specified in claim 2 of the patent, the Freeman patent, do you find disclosed in that drawing 266 the combination of apparatus for controlling the rate of combustion and the rate of supply of a heat conducting medium?

A. Yes, I do. The apparatus for controlling the rate of combustion, as indicated in the exhibit, is the burner motor, and the apparatus controlling the rate of supply of heat conducting medium is indicated in the exhibit by the word "fan."

Q. Now, the thermostatic apparatus.

The Court: What is this, XX?

The Witness: YY.

Mr. Moore: Claim 2.

The Court: Yes, but was it pleaded? How is it brought in; what character is given to it?

300 Mr. Moore: The drawing XX is a blueprint from the tracing made by Mr. Black.

The Court: What dignity do you claim for it? Is it prior art, or what is it? Is it anticipation?

Mr. Moore: It might be called prior art. It is a prior publication.

The Court: Is it claimed to be in anticipation, or just to show the state of the art?

Mr. Moore: It shows the state of the art and shows what was done by a man skilled in the art in 1927, before the Freeman patent was filed, and Mr. Black has said he found the elements of certain claims of the Freeman patent disclosed in this drawing.

The Court: All right, go ahead.

Mr. Moore: Q. Now, you have pointed out the first of the elements, the combination of apparatus for controlling the rate of combustion and the rate of supply of heat conducting medium. Now, do you find thermostatic apparatus responsive to furnace temperature?

A. Yes, sir, I do, that being the Mercoid furnace control, and below it the Mercoid warm air control.

The Court: Tell me this, just to save my study of it: How would you change Fig. 2 of Freeman so as to have the same wiring system that you have in 266; what are 301 the minimum changes you would make?

The Witness: I would take wire 28 and connect it to wire 31. I would take this blue wire 28—

The Court: And connect it to wire 31 where?

The Witness: Anywhere in 31.

The Court: Any place at all?

The Witness: Yes, sir. And there are also some other modifications that can be made in that drawing.

The Court: All I want to know is just—

The Witness: Just take wire 28 and connect it to wire 31.

The Court: Any place at all?

The Witness: Yes, sir.

The Court: And disconnect it from the thermostat?

The Witness: It still would be controlled by the thermostat, because—

The Court: I know, but I want to know what you do. You take out that line 28 and instead you would run a line from—

The Witness: I would run it right over to 31.

The Court: You would run a line from 28 over to 31 at some place other than 18, is that it?

The Witness: Yes.

Mr. Freeman: Could we get him to take a pencil 302 and just do that on that exhibit?

The Court: On 31. 28 doesn't go over to 18.

The Witness: 31 receives its power from 18 and the circuit flows from 18 through wire 29 and then through the limit control to wire 31.

The Court: What I want to know is—here, I have an extra copy of the patent in suit. Just fix up that wiring system shown in Fig. 2 so that it will be the same in principle as 266 for me, with a blue pencil. Have you got a blue pencil?

The Witness: Yes, sir.

The Court: With a common ordinary lead pencil take out anything that you take out. Don't make any more changes than necessary.

The Witness: You want the particular circuit?

The Court: Oh, no, no. I just want you to fix Fig. 2 so it will be the same kind of system as 266 by eliminating

as few lines as possible with a lead pencil and by putting in as few lines as possible with the blue pencil.

The Witness: It is just a simple change of one wire.

The Court: Go ahead. I will study it. Go ahead.

Mr. Moore: Q. You have already stated that you found the apparatus controlling the rate of combustion and the rate of supply of a heat conducting medium, thermo-
303 static apparatus or responsive to furnace temperature.

Now, do you find connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to accelerate combustion and check the supply of said medium when furnace temperature is below a predetermined degree?

A. Yes, sir. I find connections as indicated in the red and blue circuits between the thermostatic apparatus, namely, Mercoid furnace control and Mercoid warm air control and combustion apparatus, namely, burner motor and fan, whereby when the temperature is below a predetermined degree, say 140 degrees, we will find at that low temperature the switch in the limit control marked "furnace control" closed to establish the red circuit accelerating combustion by energization of the burner motor, and below that predetermined degree of 140 we find the Mercoid warm air control in open position, thus checking the supply of the cold air, because the blue circuit cannot be completed to the fan motor.

Q. That claim does not include the room thermostat and circuit, does it?

A. No, sir, it does not.

Q. You also stated that claim 5 could be read on drawing on 266?

304 A. Yes, sir.

Q. That claim reads, "the combination of apparatus for controlling the rate of combustion and the rate of supply of a heat combustion medium." That is the same as in the other claim, is it not?

A. Yes, the burner motor and fan.

Q. "Thermostatic apparatus responsive to furnace temperature." That is the same as in the other claim.

"Connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to accelerate combustion and checks the supply of said medium when furnace temperature is below a predetermined degree."

A. That is the same as in claim 2.

Q. Now, claim 5 continues: "other thermostatic apparatus responsive to the temperature of the object to be heated." Do you find that?

A. Yes, sir, I do. That is the Mercoid thermostat located in the room, the object being heated.

Q. "And connections between said control apparatus and said last mentioned thermostatic apparatus by means of which said control apparatus operates to check both combustion and the supply of said medium when said object is above a predetermined temperature irrespective of the furnace temperature."

305 A. Yes, sir; there are connections between the control and the thermostatic apparatus, which is the limit control and the thermostat as the warm air fan control, and the fan and the burner motor, with the other thermostatic apparatus, namely, the Mercoid thermostat, whereby when the room is above a predetermined temperature, let us say 74 degrees, the room thermostat will open its switch, thus cutting off the supply of electric power to both the burner motor and the fan motor.

Q. Now, in claim 7: "In a circuit control, the combination of an electrically operated combustion control apparatus adapted to accelerate combustion when supplied with electric power and to check combustion when not so supplied."

A. Yes. The electrically operated combustion control apparatus—

The Court: Let me interrupt you a moment now.

The Witness: Yes, sir.

The Court: Would you mind telling me which claim you first considered?

The Witness: 2.

The Court: And then what?

The Witness: 5.

The Court: And then what?

306 The Witness: 7. And the last would be 10.

The Court: 2, 5, 7—

Mr. Moore: We are starting on 7 now.

The Court: 2, 5 and 7, and you are going to consider—

The Witness: 10.

Mr. Moore: Claim 10 as well.

The Court: Very well. Go ahead.

Mr. Moore: Q. Now, where do you find in 266 the combination of electrically operated combustion control apparatus adapted to accelerate combustion when supplied with

electric power and to check combustion when not so supplied?

A. Referring to Mercoid's Exhibit XX and the colored Exhibit YY, the electrically operated combustion control apparatus is indicated as "burner motor," so that when the red circuit is completed to the burner motor supplying the motor with electric power, acceleration of combustion will take place, and when the red circuit is interrupted to cut off the power to the burner motor, check of combustion will take place.

Q. The next element is: "A motor driven fan for controlling the supply of air to be heated."

A. As indicated, the word "fan" designates the motor, the electrical part of the circulating fan for controlling
307 the operation of the fan.

Q. The next element is: "A source of electric power."

A. There is a source of electric power shown at the upper lefthand corner of the drawing bearing the designation "ground wire and hot wire."

Q. "Electric circuits for connecting said power source to said control apparatus and the motor of said fan."

A. There are electric circuits shown on a colored diagram, Mercoid Exhibit YY, red and blue; the red circuit to the burner motor and the blue circuit to the fan motor.

Q. Now, the next element: "And thermostatic apparatus interposed in said circuits, responsive to furnace temperature and adapted to interrupt the circuit to the motor of said fan while completing the circuit to said combustion control apparatus when furnace temperature is below a predetermined degree."

A. There is thermostatic apparatus in these circuits, namely, the Mercoid furnace control acting as a limit control, and the Mercoid warm air control acting as the fan control, both articles being responsive to the temperature of the furnace, and when the furnace temperature is below a predetermined degree, below 140 degrees, the limit switch will then be in the closed circuit position, completing
308 the circuit, as shown in red, to the burner motor, but at this lower than 140 degrees the fan control will at that time be in open circuit position interrupting the circuit to the fan motor.

Q. Now, in claim 10: "The combination of an electrically operated combustion control apparatus adapted to accelerate combustion when supplied with electric power

and to check combustion when not so supplied." You have just explained that.

A. Those are the same corresponding elements of claim 7.

Q. "A motor driven fan for controlling the supply of air to be heated."

A. The same element identified in claim 7.

Q. "A source of electric power."

A. The same applies to that source of power in claim 7.

Q. "Electric circuits for connecting said power source to said control apparatus and the motor of said fan."

A. The red and blue circuits.

Q. "Thermostatic apparatus interposed in said circuit, responsive to furnace temperature and adapted to interrupt the circuit to the motor of said fan while completing the circuit to said combustion control apparatus when furnace temperature is below a predetermined degree."

A. That is the same element and the same mode of
309 operation which the same language in claim 7 defines.

Q. In addition to what is said in claim 7, this claim 10 continues: "and other thermostatic apparatus interposed in said circuits in series connection with said first mentioned thermostatic apparatus, responsive to the temperature of the space to be heated."

A. Yes; the other thermostatic apparatus is the Mercoid thermostat, and, as specified in this claim, it is interposed in the circuits, in said circuits in series connection; that is to say, that the flow of current to the burner motor must pass through the thermostat as well as the limit control, in order for full completion of the red circuit and the circuit controlling the fan, the blue circuit must pass through the room thermostat as well as the fan control to energize the blue circuit.

Q. Now, is that "adapted to interrupt the circuits to both said combustion control apparatus and to the motor of said fan when said last mentioned temperature is above a predetermined value"?

A. Yes, sir, since this is a series connection that I have explained that both the blue and the red circuits to be completed must pass through the room thermostat when the room temperature rises to 74 degrees to open the room thermostat switch, it therefore interrupts the supply
310 of electric power to both the burner motor and the fan.

Q. You have described the use of the Fig. 50 here in

this drawing 266 in 1927 as being used as a furnace fan control. Have you any Mercoid literature, or did you find any Mercoid literature describing the use of the Mercoid furnace control Fig. 50 as a furnace fan control?

A. Yes, I did.

Q. And what was that? Do you remember? Use that one. (Handing document to the witness.)

A. Yes, sir.

Q. You are referring, are you, to Mercoid Catalog No.—what is it, H-5?

A. H-3 of 1928.

Q. Of 1928?

Mr. Bair: Does that have any exhibit number?

The Witness: It is marked for identification Mercoid Exhibit X.

Mr. Moore: Q. I call your attention to page 23. The heading is, "Mercoid furnace controls for warm air furnaces," and there is an illustration there of Fig. 50. Does that illustrate the instrument Fig. 50 you had in your hand and showed the court this morning?

A. Yes, sir, it does.

Mr. Moore: I want to call the court's attention to 311 the first sentence in this descriptive matter which reads, "The instruments shown above are designed for operation on warm air furnaces that are equipped with motor driven units. The bronze stem, which is charged with an expansive liquid, is intended for installation in the furnace hood above the dome, while the instrument proper may be mounted conveniently on the wall by means of the brackets provided therefor, as shown in the illustration. When so installed this control operates as a positive safety device to prevent overheating, standard range 250 degrees to 300 degrees Fahrenheit, opening the electric circuit at the highest point and restoring it on a 50 degree drop in the temperature in the furnace dome." And the last three lines there is a heading, "Furnace fan control for automatic control of booster fans on warm air furnaces. Standard range 190 degrees Fahrenheit to 140 degrees Fahrenheit cutting in at high point to start the fan motor and cutting out when the dome temperature drops to the low point."

Q. Now, I wish to call your attention to page 28 entitled, "Typical Mercoid wiring diagrams." "The simplicity of the Mercoid system of two-wire direct control is fully recognized. There are no confusing or intricate wir-

ing installations to be made. The hazards and ex-
312 pense of improper hook-up are avoided."

What is the diagram at the upper left hand corner on this page?

A. That is a wiring diagram for an oil burner in which there is included in the control circuit a Mercoid room thermostat and a Mercoid boiler or furnace control, the two devices being wired in series connection with the burner motor.

Q. Now, in this wiring diagram the thermostat is the first instrument in the circuit leading to the supply, is it not?

A. Referring to the enlargement of Fig. 2, Mercoid Exhibit VV, that is Fig. 2 of the Freeman patent. The red circuit first passes through room thermostat.

Q. And does that in the diagram you have in your hand?

A. Yes, sir.

Q. And then passes through the limit control?

A. Yes, sir.

Q. As shown in the limit control in Fig. 24 in the Freeman patent?

A. Yes, sir.

Q. And then to the motor?

A. Yes, sir.

Q. Now, I call your attention also to page 10, which
313 is entitled, "Mercoid Risertherm," and it illustrates Fig. 35 Risertherm mounted on vertical pipe.

Mr. Freeman: Do you have a photostat of that?

Mr. Moore: Yes. (Handing document to Mr. Freeman.)

Q. Can you produce one of these Risertherms as illustrated on that page?

A. Yes, I have one in my hand.

Q. Does that have a name plate on it?

A. Yes, it does.

Q. Does it have any patent numbers on there?

A. Yes, there are several patent numbers appearing on this plate.

Q. Does it bear patent number 1,817,634?

A. Yes, sir.

Mr. Moore: A copy of McCabe patent 1,817,634 is offered in evidence as MERCOID EXHIBIT ZZ.

(The instrument was so marked.)

Mr. Moore: Q. Now, I show you here an enlargement—

Mr. Freeman: Has that patent been pleaded, Mr. Moore?

Mr. Moore: I do not know if it has been pleaded. I think it is set up somewhere in the pleadings.

Mr. Freeman: I am unable to find it. I do not have a copy of it.

Mr. Moore: I will be glad to give one to you.

314 Mr. Freeman: Are you putting it in to show the state of the art or as showing an anticipation?

Mr. Moore: I am putting it in to show what it is. That is the Mercoid combination control—

Mr. Freeman: I would like to have an answer to my question. I wanted to know whether it shows the prior art or shows an anticipation. I know what it shows on its face. I can read it, too.

Mr. Moore: It refers to the prior art without having been set up in the answer.

Mr. Freeman: Not for the purpose of anticipation?

Mr. Moore: I did not say anything about anticipation. I said referring to it as prior art, and it shows what it is on its face.

Mr. Freeman: May we have a ruling from the court?

The Court: I think that is a fair question. Do you rely upon it in anticipation or do you rely upon it as merely showing the state of the art?

Mr. Moore: Your Honor, it shows a combination of the patent elements of the Mercoid which all led up and all answers the definition of the combination furnace control specified in this license which Minneapolis wanted Mercoid to take and to pay royalty upon their instrument. Now, that definition reads on the earlier McCabe disclosure 315 and on this disclosure and on a still later disclosure. With the later one having been set up in the pleadings, these may not have been set up in the pleadings. They show prior art and show what was done in making a unitary structure having two switching means.

The Court: I gather you are not relying on it as anticipation or prior art, but you are just trying to show what the parties were negotiating about.

Mr. Moore: What the Mercoid Corporation had on the market before they were negotiating about it. I do not know whether that would not be relying upon it, to anticipate the Freeman patent, because the Freeman patent does not show what they define as a combination furnace control.

The Court: It may be a good idea some time before the case is over for the court to know what your contention is in respect of it.

Mr. Freeman: It would help me a lot in both my cross-examination of this witness and what we have to prepare to meet. If he is putting these patents in to show what we defined in some license agreement in 1939, that is one story, and if we have to meet that, why, we will endeavor to meet it.

Mr. Moore: That is what I am putting it in for. It
316 is put in as prior art, which shows that it was what I said, meeting the terms—

Mr. Freeman: Prior art as against a proposed license agreement that we offered to Mercoid Corporation sometime in 1939 or 1940. With that understanding, I have no objection.

Mr. Moore: All right.

Mr. Freeman: To it going in.

Mr. Moore: And in which they define the article upon which they wanted Mercoid to pay a royalty.

Now that the smoke has cleared off, you have no objection to it?

Mr. Freeman: With the understanding that they are going in directed to the license agreement that we wrote sometime in 1939 and offered to the Mercoid Corporation, meeting that definition.

Mr. Moore: Yes.

Mr. Freeman: Not that we concede that it does, but it is merely your position with respect to it meeting the license agreement.

Mr. Moore: That is it. The court understands the reason we are putting these in now?

The Court: I think so.

Mr. Moore: Q. I referred you to an enlarged pho-
317 tostat of this Risertherm. Will you describe the operation, construction and operation, to the court in just as simple language as you can?

A. The McCabe patent No. 1,817,634 relates to a form of temperature-responsive electric switch which is intended to be responsive to the temperature of a tank or a pipe through which a fluid medium, such as steam or hot water, may pass so as to control apparatus according to the temperature of the pipe to which the switch is clamped.

As illustrated in Fig. 3, this switch is clamped to a pipe through which hot water or steam may pass and heat transmitted to the thermal element of the switch to operate the switches of the instrumentality. The portion clamped to the pipe is designated by the numeral 2 and it contains the thermal or power element which is responsive

to the temperature at the pipe. This element, while not visible from this drawing, is of an envelope form and it contains a volume of volatile liquid much in the same way as the bellows of the Fig. 21 control and the stem of the Fig. 50 control, so that upon a rise in temperature at the pipe the heat therefrom will be transmitted to the thermal element and cause an expansion of the liquid within it and that will cause the element, the envelope, to expand,
318 and when the temperature declines in the pipe there will correspondingly be a collapse of this envelope.

Within the switch casing is supported for movement two mercury switches. There is only one reference numeral, that 40, designating these two switches.

It is evident from the drawing that the front switch has its contacts to the left and the switch directly behind it has its contacts to the right. Then there is an operating mechanism, which I shall refer to generally by the numeral 20, which is responsive to the expansion and collapse or contraction of this envelope as changes take place in the temperature in the pipe.

As illustrated in Fig. 3, with a low temperature prevailing in the pipe, the mercury switches will assume the position as we see them, and I should also call attention to the fact that on the upper right of the casing there extends to the outside an adjustment by means of which we may determine when or at what temperature the switches will change their position as a temperature rise occurs in the pipe. As the temperature does increase in the pipe, the thermal element of 2 will expand, and through the actuating mechanism 20 throw or tilt the switches so that they assume a reverse position so that the left hand contacts of the
319 front switch are raised and the circuits through the switch broken and the right hand contacts of the rear switch lowered so the circuit through that switch may be closed.

The switches 40 are mercury switches of a kind that I referred to before in which there is a body of mercury that flows to the low end of the tube, and if the low end in which the position of the switch has been placed contains the contact, then the circuit will be closed through it.

I have here a sample of this switch, as exemplified in the McCabe patent Fig. 3 which differs from the first one I explained to your Honor here, in that the contacts, the wire connections, are made out of the end of the tube, whereas the wire connections of the contacts in the first

mentioned tube, such as found in Fig. 21 Mercoid thermostat come out of the top end of the tube.

There are some other details of construction in the switch, but fundamentally the circuit closes when the contact end is lowered, and the circuit is opened when the contact end is raised, because of the mercury falling away from engagement with the contacts.

The Court: How many contacts entered that envelope?

The Witness: There are two switches and a pair of
320 contacts in each.

The Court: Each end?

The Witness: No, there are two switches, like this, your Honor. Here is one switch. (Illustrating.) The front switch assumes this position with one pair of contacts shown lowered. The rear switch assumes this position in the drawing, so its pair of contacts is raised and the circuit opened.

The Court: Why do you have to have two tubes?

The Witness: Well, there are times when there is desired the closure of one circuit with the opening of the other. If you wish to control more than one piece of apparatus, the circuit of one flowing—

The Court: Why can't you do that with one?

The Witness: If we wish to place in operation apparatus on a rise in temperature and other apparatus to be energized on a drop in temperature, we could not accomplish that with one tube, because we make and break only one circuit upon one rise.

The Court: Do you have a piece of apparatus where the two tubes are harnessed together?

The Witness: Does that answer your question?

The Court: Yes. You do not have two tubes harnessed together?

321 Mr. Freeman: They are harnessed together in this physical device.

The Court: What difference does it make? What is the advantage of the two? I do not know that it makes any difference. I don't want to spend much time on it. I just wondered. Do you know?

The Witness: Where we have to close a circuit on a rise and open a circuit on a rise in temperature, as the temperature goes to, say, 200 degrees, we want to close the circuit and we also want to open the circuit at 200 degrees; we therefore need two switches to accomplish that.

The Court: Couldn't you have the same quantity?

The Witness: Contacts in the same switch, perhaps, is in your mind?

The Court: Yes.

The Witness: Yes, sir. I have called your attention to—

The Court: I am asking, why do you have to have two tubes? Why don't you have one tube?

The Witness: You could, your Honor, if we placed it—I could put another contact here.

The Court: Yes.

The Witness: And there are illustrations in that 322 bulletin.

The Court: Tell me, why do you have two? So they won't be jumping?

The Witness: I should say with a switch like this there is a possibility that the circuits may overlap and you get positive action in the other form.

Mr. Freeman: That is why. It is for safety's sake.

Mr. Moore: Q. Have you finished with your brief description?

A. Yes, sir.

Q. Have you got a copy of this patent?

A. No, I have not.

Q. Is there anything in there that authorizes you to make the statement that one switch opens when the other one closes?

A. Yes, sir. On page 4 of the McCabe patent 1,817,634, column 2, line 100:

"At times it is desirable to control two circuits and in such a case two mercury tubes are adapted to be supported in an additional set of clamps supported upon the plate 42, as shown in Figure 5. Figure 3 illustrates two circuits, each connected to a mercury tube switch, in which one circuit is broken when the other is closed."

323 Q. Now, referring to the definition of combination furnace control set up in the license proposed to Mercoid and granted to Cook and four others, do you find disclosed in this McCabe drawing a unitary structure including at least a switching means for controlling not less than two circuits?

A. Yes, sir.

Mr. Freeman: That is trying the license agreement and not the patent?

Mr. Moore: The license agreement. I so designated.

The Witness: A. I find a switching means comprising

the two switches mounted one behind the other designated at 40 which controls two circuits.

Mr. Moore: Q. And operated by temperature-responsive means or responsive to temperature of a heating device or fluid medium heated thereby?

A. Yes, sir, the switches 40 are responsive to a thermal device 2 which is responsive to a fluid medium temperature such as hot water from a heating device.

Q. One of said circuits being established on temperature rise and another being established on temperature fall?

A. Yes, sir; the switches are arranged as shown in Fig. 3 wherein the circuit is closed in the front switch and
324 open in the rear switch, so upon a temperature rise the rear switch will be closed and the front switch opened, and upon a temperature fall the front switch will be closed and the rear switch opened.

Q. The structure having permanent internal wiring connecting the switching means to the terminals for the connection of external wires thereto?

A. Yes, sir. Inside the case is located two pair of terminal posts, to which are connected by wires the contacts of the front switch and the contacts of the rear switch, these binding posts also serving as means for connecting to external wires.

Q. Now, this morning Mr. Courteol produced a specimen of the M-51 Mercoid control, and I believe you identified certain patents as being found on the name plates, including patent No. 1,834,288, and I show you here an enlargement of the drawings of this patent.

You have copies of this one, haven't you?

Mr. Freeman: That is the one you pleaded, No. 1,834,288.

Mr. Moore: Copy of the McCabe patent No. 1,834,288, is offered in evidence as MERCOID EXHIBIT AAA.

(The document was so marked.)

Mr. Moore: Q. I want to ask you first, did you make that drawing?

325 A. Yes, sir, I did.

Q. What did you make it from?

A. That drawing was made upon viewing the actual instrument and detailed drawings that were made for producing the various parts which comprise it.

Q. You made those detailed drawings, too?

A. Yes, sir.

Q. Will you explain as briefly as you can to the court how this M-51 operates and how it is constructed?

A. Referring to the McCabe patent No. 1,834,288, this patent relates to a temperature actuated electric switch which can control circuits upon a rise or a fall in temperature and it is particularly identified with uses in connection with warm air furnaces and the controlling apparatus in connection with the change of air temperature. This device contains three essential elements as did the Riser-therm and the thermostat which I referred to before. The thermal or power actuating element as shown in Fig. 1 takes the form of a bimetallic coil, a coil of metal which when subjected to temperatures will wind up and become smaller, upon a rise in temperature, and when the temperature lowers the coil will unwind.

The one end of the bimetallic coil is secured to a sleeve that is fixed to the casing housing the switch instru-
326 mentality. The switch casing is designated as 4 and the sleeve to which one end of the coil 1 is attached is 2. The other end of the bimetallic coil is free to rotate on temperature changes and is connected to a shaft 5 which runs through the sleeve 2 and terminates within the casing enclosure 4.

The Court: What are the bimetallic coils ordinarily made of?

The Witness: They are made of two dissimilar metals, one expanding at a greater rate than the other.

The Court: Is there any secrecy about it?

The Witness: Maybe steel and brass, or a combination would do it.

The Court: What is this one here?

Mr. Freeman: This one we have on the desk.

The Witness: Well, I am not sure of all of them.

The Court: What do you think?

The Witness: Well, brass forms part of the element right here.

The Court: Which is the brass? Where is the brass portion?

The Witness: Let's see. This would be the outer portion, so as it was subjected to heat it would wind up and expand.

327 The Court: More rapidly?

The Witness: Than the inner portion.

The Court: And it is probably what?

The Witness: I am not sure just what that is.

The Court: Possibly steel? Is it made of steel?

The Witness: An alloy.

Mr. Freeman: With a certain amount of nickel in it.

The Witness: And nickel in it, too, yes.

Mr. Freeman: There are two pieces of metal; if I might say, that are welded together and their coefficient of expansion is different so that one expands more than the other one.

The Court: So that winds it up, does it?

The Witness: Yes, as it gets hot.

The Court: And makes it smaller in circumference?

The Witness: Yes, sir.

The Court: Smaller in diameter?

The Witness: Yes, sir.

Mr. Moore: That bimetallic metal is called thermo metal, a material that you can buy on the market.

The Court: I understood that. I just wanted to know what that was.

Mr. Moore: Yes.

The Witness: Inside the casing as shown in Fig. 1 in dot and dash lines are mounted two switches that control
328 the electric circuits, and for causing the movement of those two switches there is an instrumentality attached to the shaft.

Also mounted to the shaft as shown in Fig. 2 is a disk upon which are mounted two adjustments marked "high" and "low." These two adjustments may be positioned over a dial as shown in Fig. 2 to determine at what temperatures actuation of the switch will take place.

The switch or switches are mounted upon a tiltable bracket 25 shown in Fig. 1, and that bracket carries an arm 30 which extends over the face of the disk or wheel 11. The high and low pointers also have associated with them two actuating members as shown in Fig. 5, namely, 19. As shown in Fig. 2 the instrument is set to close the switch designated 22 when the temperature of the bimetal 1 reaches approximately 75 degrees, and the high setting is set to open switch 22 when the temperature of the bimetal reaches approximately 150 degrees. When the temperature rises at the bimetal there is a rotative movement imparted through the shaft 5 to the wheel 11 shown in Fig. 2, and the wheel 11 will carry with it the high pointer and the actuating arm 19 to engage the projection 30 as shown in Fig. 2 and tilt the switch to the open position.

When the temperature should decline in the bimetal
329 coil 1 there will be a reverse movement imparted to the wheel 11, and the low pointer and its associated actuating arm 19 will be rotated in a counter clockwise movement to engage the arm 30 connected with the bracket 25, and the mercury switch 22 then will be moved to the closed circuit position.

The Court: We will take a short recess.

(A short recess was had after which the proceedings were resumed as follows:)

The Court: Proceed.

Mr. Moore: Q. Had you finished your brief description of the operation of the M-51 in relation to the McCabe patent No. 1,834,288?

A. Yes, sir.

Q. Did you state what Fig. 3 illustrates in that patent?

A. Fig. 3 illustrates the use of two mercury switches in the instrument, and they are arranged for two-circuit operation, that is to say, on a temperature rise one switch will close its circuit while the other switch opens its circuit.

Q. Do you find any authority in the patent for that statement?

The Court: Could you put two of those switches on one expansion and contraction device?

330 The Witness: Yes, sir.

The Court: Well, practically. Practically, can you do it?

The Witness: Oh, yes.

The Court: Would you set your tubes at different angles? How do you do it? Don't spend too much time.

The Witness: The switch is designed to carry two switches, if desired, taking one position with contact to the left, and the other with contact to the right, so that when the switch is moved in one direction the circuit is open while it is closed in the other.

The Court: I know. Can you put the two switches on the same expansion and contraction device?

The Witness: Operated by the same bimetal?

The Court: And open one at a certain temperature and open the other at another temperature; open and close at different temperatures?

The Witness: Yes, sir. That is what is done in this instrument.

The Court: How is it done? Mounted at different angles?

The Witness: Each switch is mounted on its own carrier and each switch has its own adjustment.

Mr. Freeman: You are now talking about the in-
331 strument in suit and not about the earlier stuff?

Mr. Moore: Just talking about the M-80.

The Court: No, just gossiping. Go ahead.

Mr. Moore: Q. Now, I asked you did you find anything in the patent to authorize that statement you just made?

A. Referring to the McCabe patent No. 1,834,288, page 2, column 2, line 116:

"Fig. 3 does illustrate two mercury tube switches mounted upon the switch carrying plate 25 tilted in one direction with a circuit closed in one switch and broken in the other, and it is obvious when the switch carrying plate 25 is tilted in the opposite direction the closed circuit will be broken and the open circuit will be closed."

Q. Now, referring to the definition of combustion furnace control as set forth in the license proposed to Mercoid and in the license granted to Cook and the others, do you find disclosed on Fig. 3 of this McCabe patent a unitary structure including at least a switching means for controlling not less than two circuits and operated by temperature-responsive means responsive to the temperature of a heating device, or the fluid medium heated thereby?

A. Yes, sir. As shown in Fig. 3 there is a switching means comprising two switches, both of which carry the reference numeral 22, those two switches being shown
332 also in Fig. 1, and the switches are responsive to a thermal member 1 of Fig. 1 which is responsive to the temperature of a heating medium for operating the two switches.

Q. Where is the unitary structure including at least a switching means for controlling not less than two switches?

A. The unitary structure is the apparatus disclosed in Fig. 1 of the drawing.

Q. That includes the casing in which the switches are mounted, does it?

A. Yes, sir, as shown.

Q. Are one of the circuits established on temperature rise and another established on temperature fall?

A. Yes, sir. The two switches as shown in Fig. 3 are arranged with the contacts of the front switch to the right and the contacts of the rear switch to the left, so that upon a temperature rise the switches would reverse the position

shown in Fig. 3, whereupon the circuit in the front switch would be closed and the circuit in the rear switch would be opened.

Q. Now, does that structure have permanent internal wiring connecting the switching means to terminals for the connection of external wires thereto?

A. Yes, sir. As shown in Fig. 3 there are internal
333 connections comprising wires from a pair of binding posts to the left side connecting one of the switches 22 and internal wires connecting with the pair of binding posts to the right side of the case to the contacts of the other switch 22. These binding posts incidentally provide means for connections to external wires, there being shown in Fig. 3 two cylindrical bosses on the lower part of the case through which external wires may enter to the right hand pair of posts and through which terminal wires may enter to the left hand pair of terminal posts.

Q. Did you make a search of the Mercoid records to find the first illustration in the Mercoid literature illustrating this M-51?

A. Yes.

Q. What is the catalog you have there?

A. I have in my hand Mercoid Catalog No. H-5.

Mr. Moore: 1929. Which has been marked for identification Mercoid Exhibit Y.

(Handing document to the court.)

Mr. Moore: Q. I call your attention to page 7 which is entitled "Mercoid Pressure Control." I see an illustration there of Fig. 31-L showing two switches. Is that a similar illustration to one of the earlier catalogs that you have identified here?

A. Yes, sir.

334 Q. I call your attention to page 10 which is entitled "Mercoid Risertherm," which illustrates a picture of the Mercoid 35-L Risertherm in the lower right hand side, is that the Risertherm that you describe in connection with the McCabe patent No. 1,817,363?

A. Yes, sir.

Q. And that illustrates two pictures too, does it not?

A. Yes.

Q. Now, I call your attention to page 24 entitled "Mercoid Furnace Controls, a new design in furnace controls employing a thermostatic metal coil for warm air furnaces and booster fans." There is an illustration of an M-51.

Is that a picture of the M-51 that was produced by Mr. Courteol, the actual instrument?

A. Yes, sir, it is.

Q. And that is the one that you describe in connection with the McCabe patent No. 1,834,288?

A. Yes, sir.

Mr. Moore: I wish to call the court's attention to the first few sentences of the descriptive matter in the left hand column:

"This control is used to prevent the overheating of warm air furnaces, used also for booster fan control to turn on fan when the furnace temperature has reached a predetermined degree, shut off when the furnace has cooled to
335 a predetermined degree."

I also want to call attention to the descriptive matter in the right hand column:

"When ordering specify, if it is to be used as a safety furnace control or for booster fan application, the same control can be used for either purpose by simply reversing the Mercoid tube. For furnace control the mercury switch is placed so the contacts or electrodes in the switch are to the left side, while for booster fan installation the Mercoid switch is placed with the electrodes to the right side."

Q. Now, I call your attention page 25 entitled "Mercoid Furnace Controls for Warm Air Furnaces." There is an illustration of Figure 50. Is that a picture of Figure 50 instrument which was described and disclosed in the earlier bulletins, and a specimen of which you have here in court?

A. Yes, sir.

Q. Now, then, page 24 and 25 face each other. I show you an enlarged photostat of those two pages and I ask you to step down and point out to the court the similarity and difference, if any, between M-50, Figure 50, and M-51.

A. The M-51 is used either as a limit control or a fan control and is thus used for the same purpose and
336 function as previously the figure 50 control was used for limit control and fan control. That is to say, the functions and use of the M-51 and the Figure 50 are the same. They differ principally in the type of thermal metal or thermal member used to be responsive to temperature changes to operate the switch in the control circuit. Whereas, in the earlier model, Figure 50, the volatile filled thermal element of trombone shape was used to impart movement within the instrumentality to actuate the switch

upon temperature changes. The later model, Figure M-51, substituted that form of thermal member with the bimetallic form of thermal member. And in the M-51 control there was incorporated an adjusting means to set the operation of the switch anywhere over a scale of 50 to 650 degrees temperature.

Q. Is there any means in the Figure 50 of adjusting the setting of the switch?

A. Yes, there was, and it is explained in the body of the descriptive matter applying to that instrument. I refer to the last sentence of the longest paragraph appearing on that page which states:

"The range may be adjusted by simply sliding the stem in or out of the furnace hood, also by the standard adjustment on the back of the case."

337 The last need not be specified.

Q. Now, I ask you to refer to page 31 of this catalog entitled "Typical Mercoid Wiring Diagrams, the simplicity of the Mercoid system of two-wire direct control is fully recognized. There are no confusing or intricate wiring installations to be made. The hazard and expense of improper hook-up is avoided."

I ask you to state what wiring diagram 740 illustrates.

A. Diagram 740 illustrates the wiring for an oil burner in which in the control circuit is employed a Mercoid room thermostat and a Mercoid boiler or furnace control wired in series for controlling the operation of the burner motor.

Q. That is similar to the wiring diagram as illustrated in 1924 in Mercoid Bulletin D, marked for identification Mercoid Exhibit U, is it?

A. Yes, sir, both diagrams employ the room thermostat and the limit control in series circuit arrangement.

Q. And I believe you applied that to the colored wiring diagram of the Freeman patent marked Mercoid Exhibit VV, have you?

A. Yes, sir, the series circuit arrangement in that exhibit is the connection involving the room thermostat
338 18 and the limit control 24 in the red circuit.

Q. I ask you what is shown on page 32 in wiring diagram 748?

A. There is some descriptive matter set up in type below that diagram which reads:

"The diagram to the right is a connection with the use of Mercoid Figure M-51 and Figure 50 control."

And within the borders of the drawing 748 the title appears: "Wiring for Oil Burner and Warm Air Furnace Fan."

The wiring of the apparatus involved in this diagram follows the circuit arrangement that is disclosed in Mercoid drawing No. 266, Mercoid Exhibit YY.

Q. That is the enlargement of the drawing 266 with the circuit indicated in color, is it not?

A. Yes, sir.

Q. In your search of the Mercoid records what was the next bulletin that you found that related to this M-51, M-52 or M-53?

A. I found the Mercoid Bulletin No. S-83.

Q. Now, this bulletin has been marked for identification during the taking of Mr. Courteol's testimony as Mercoid Exhibit Z. I call your attention to the inside of the cover which is marked: "Mercoid Furnace Controls a new design in warm air furnace control employing thermostat 339 metal coil."

I see illustrated a picture of Figure M-51 control, M-52 control and M-53 control. Is that the same illustration of the M-51 that we have referred to heretofore?

A. Yes, sir.

Mr. Moore: I offer in evidence the M-51 control produced by Mr. Courteol as MERCOID'S PHYSICAL EXHIBIT OOO, and a specimen of the Mercoid M-53 fan control as MERCOID EXHIBIT OOO-1.

(The articles were so marked.)

Mr. Moore: Q. Now, I ask the witness if he can produce a specimen of the M-52 referred to in the Bulletin S-83, marked for identification Mercoid Exhibit Z?

A. Yes, I have one here.

Q. Where did that come from?

A. It came from the stock of the Mercoid Corporation.

Mr. Moore: This is offered in evidence as MERCOID EXHIBIT OOO-2.

(The article was so marked.)

Mr. Moore: I offer in evidence Mercoid specimen of the M-80 as MERCOID EXHIBIT PPP.

(The article was so marked.)

Mr. Moore: Q. Referring now to the M-53, Mer- 340 coid Exhibit OOO-2, do you find patent numbers on that plate?

A. Yes, sir, I do.

Q. Do you find the patent No. 1,834,288?

A. Yes, sir.

Q. And that is the McCabe patent No. 1,834,288 introduced in evidence as Mercoid Exhibit AAA?

A. Yes, sir.

Q. And which you described and explained to the court?

A. Yes.

Q. Then each one of these three instruments, M-51, M-52 and M-53, all bear the patent No. 1,834,288, is that correct?

A. Yes, sir.

Q. And the M-80, Mercoid Exhibit PPP, does that have a name plate?

A. Yes, sir.

Q. Do you find patent No. 1,834,288 on that name plate?

A. Yes.

Mr. Freeman: I am just wondering if this witness has checked the patent claims to see they read on each of these devices? Has he done that?

Mr. Moore: I imagine he has, yes.

Mr. Freeman: Otherwise the devices themselves show whether the patent markings are on them.

Mr. Moore: You can ask him on cross-examination 341 if you want to.

Q. What was the next piece of Mercoid advertisement or literature that you found in this search of yours?

A. I found a Mercoid Corporation bulletin marked A-5.

Q. Now, that is the bulletin that was asked to be marked for identification AA. This is entitled "Mercoid M-53 Warm Air Furnace Fan Control," and on the back of the front page it is entitled "Mercoid M-53 Warm Air Furnace Fan Control," the ideal control for all types of booster fan applications," and there is a picture of a Figure M-53; is that a representation of the Figure M-53 that you just produced?

A. Yes, sir.

Q. Have you explained what the difference is between M-51 and M-53?

A. I don't believe that I have. There has been some reference made to it before but I will say this, that the two instruments differ only in the position of the mercury switch inside the casing. The M-51 has the switch arranged with its contacts to the left so when the temperature rises the switch may be opened, whereas, the Figure M-53 has its switch arranged with its contacts to the right whereby upon a temperature rise the switch is closed. That is the

only difference that rests between the M-51 and M-53.

342 Q. Now, I call your attention to the wiring diagrams on the bottom of that page. Very briefly what does the wiring diagram illustration No. 4 illustrate?

A. Illustration No. 4?

Q. AA.

A. Illustration No. 4 illustrates the control of a circulating fan through a room thermostat and Mercoid furnace fan control type M-53, there being a series circuit connection of the two controls to the fan.

Q. That is similar to this red circuit that you have referred to in the Freeman patent, is it?

A. No, sir. This would be likened to the blue circuit of the enlargement of Figure 2 of the Freeman patent, Mercoid Exhibit VV, that circuit including a series connection of the room thermostat 18 and the fan control 23 to the fan motor 22.

Q. What does illustration No. 5 illustrate,—the wiring diagram?

A. Illustration No. 5 is an illustration of a diagram for hooking up controls to a burner motor and a fan motor. I might simply say it carries out the mode of operation exemplified in the enlarged drawing No. 266, Mercoid Exhibit YY. The same would apply to illustration No. 6.

343 Q. What was the next piece of literature of the Mercoid Corporation that you found which related to the use of the M-51, M-52 and M-53?

A. I located the Mercoid Bulletin marked Bulletin A 14.

Q. Now, referring to page 7, which is entitled "Type M-61 Stoker Control," there is a picture of the M-61 stoker control in the center. Now, over to the right hand column under the heading "Type M-51 and M-52 Warm Air Furnace Controls," I find the following description:

"The Type M-51 Mercoid control has been designed to prevent the overheating of stoker fired warm air furnaces. It is identically the same as the Figure M-61 stoker control, except that it has an adjustable mounting flange and a longer sleeve which permits the bimetal operating coil to extend further into the furnace. By means of the adjustable flange the instrument can be easily installed on any furnace hood where the angle is from 30 to 90 degrees. The Type M-52 Mercoid control is identically the same as the Type M-51 except that it has two separate circuits, the one closing on a dropping temperature and the other on a rising temperature.

"On a stoker fired warm air furnace equipped with an air circulating fan this control serves a dual purpose which will intermittently fire the stoker for short periods of
344 time when the thermostat is in the off position, and will permit operation of the circulating fan only when the thermostat is calling for heat and the furnace is heated. See wiring diagram No. 3."

I will show you an enlarged photostat of wiring diagram No. 3 which has the circuits shown in colors. Now, I ask you to explain to the court the instrumentalities shown in that wiring diagram in the manner in which they are hooked up to control the operation of the stoker motor.

A. This diagram shows a warm air furnace to which is connected for generating combustion in the furnace a stoker having a stoker motor so designated in the drawing. The furnace also has a circulating fan operated by a fan motor, so designated in the drawing.

Controlling the operation of the combustion circulation apparatus are three thermostats or temperature responsive switches. The first I refer to is a room thermostat designated as No. 855 Mercoid thermostat. That is at the center upper portion of the drawing. Extending from the bonnet of the furnace to the left is the furnace limit control designated as M-51 Mercoid furnace control. In the center of the furnace dome is a thermostatic switch designated off to the right as M-52 Mercoid stoker and fan control.

345 Shown in the enlargement of Mercoid Exhibit BB-1, the diagram No. 3, the circuit to the stoker motor is in red, and that includes the room thermostat No. 855 and the M-51 limit control in series circuit connection to the stoker motor.

Shown in blue is the fan circuit which includes the room thermostat No. 855 which extends down to a point where the lower blue line of the two uppermost lines connect with it and that is through the bottom of the two switches in the M-52 control providing a series circuit connection to the fan motor. This circuit arrangement provides the sequence of operation that is disclosed in the Freeman patent, exemplified in colors shown on the enlargement of Figure 2 of the Freeman patent marked Mercoid Exhibit VV.

Mr. Freeman: Q. All the claims?

A. Yes, sir. The arrangement, perhaps I may be able to brief down here a bit. When the room thermostat No.

855 upon a drop in room temperature to 72 degrees closes its switch, and with a temperature in the furnace below 140 degrees present, the red circuit may immediately be completed through the room thermostat No. 855 through the M-51 furnace control to the stoker motor to place it in operation and accelerate combustion. Because of this
346 lower than 140 degrees temperature the limit control, of course is in closed circuit position; likewise because of this below 140 degrees temperature in the furnace the lower switch of the M-52 is in open circuit position.

The Court: Q. What is the date of this circular?

Mr. Freeman: That happens to be subsequent to the application of the Freeman patent.

Mr. Moore: But before the granting of the Freeman patent.

The Court: Just a minute. Wait until I get an answer to my question.

Q. What is the date?

A. The date of this bulletin which appears on the second page in the lower left hand corner is February 8, 1931. I believe that is possibly about three weeks following the filing date of the Freeman patent.

With this lower than 140 degrees temperature in the furnace, the fan switch in the M-52 control will be in open circuit position so that the fan at this time of course does not operate. As the temperature within the furnace following the acceleration of combustion rises to 190 degrees temperature, the lower switch in the M-52 control will close its circuit, thus completing the blue circuit to the fan
347 motor which includes the room thermostat No. 855.

If during the period of combustion acceleration, while you are raising the temperature of the furnace, the temperature should reach 300 degrees before the room thermostat opens its circuit, the M-51 limit control will respond to 300 degrees and open its switch, whereupon the flow of electric power to the stoker motor will be cut off and we will check the acceleration of combustion.

However, since the room temperature has not reached 74 degrees, the room thermostat No. 855 will still be calling for heat, and with the stoker now shut down we still maintain a circuit from the room thermostat No. 855 to where it joins with the blue circuit through the lower switch of M-52 to the fan motor to continue its operation.

As the temperature within the furnace recedes from 300 degrees, because we have checked the combustion, there

will then occur at, we will say, 250 degrees a reclosing of the switch in the M-51 limit control, whereupon we re-energize from the room thermostat the red circuit and again cause an acceleration of combustion.

With heat continually being furnished to the room,
348 and the temperature reaching 74 degrees, the room thermostat then will open its switch, whereupon it will cut off the electrical supply of power to both the stoker motor in the red circuit and the fan motor in the blue circuit, and the action of the room thermostat in shutting down the stoker motor and the fan motor does so irrespective of the temperatures prevailing at that time in the furnace.

349 Q. Mr. Black, at the close of your testimony you were referring to the colored wiring diagram No. 3. Have you completed your remarks on that diagram?

A. Yes, sir.

Mr. Moore: The enlarged colored wiring diagram No. 3 from Bulletin A-14 is offered in evidence as MER-
350 COID PHYSICAL EXHIBIT BB-1.

Mr. Freeman: That is objected to on the ground that it is a reproduction of something that is subsequent to the filing date of the Freeman patent and there has been no showing of its purpose.

The Court: What is the purpose?

Mr. Moore: I think the purpose shows very clearly, your Honor, that the date of this publication is three weeks subsequent to the filing date, but it was prior to the patent date, and it shows that the engineers of The Mercoid Corporation published a wiring diagram of a hook-up including the same elements as in the Freeman patent. They had no knowledge of the Freeman patent until it was published. It is merely showing a development of the positioning of the various elements in the control circuits of a hot air furnace from an earlier date of the Mercoid Corporation to a date when—

The Court: Well, it may be received. What effect it will have I do not know, but it may be received.

(The enlarged colored wiring diagram No. 3 was so marked.)

Mr. Moore: Q. Mr. Black, I believe you read from the description of the Freeman patent something about a sum-
mer switch, which was not illustrated on the Freeman
351 patent. Does this diagram illustrate a summer switch?

A. It does.

Q. And what is the purpose of the summer switch?

A. The purpose is explained in the drawing itself. It is a dotted rectangle with the notation to the right specifying: "Snap switch, closing this circuit, will operate fan continuously for ventilating purposes during the summer."

It is so arranged in the circuit that the fan may operate when the switch is closed, irrespective of the circuit position of any of the other control apparatus.

Mr. Freeman: That is objected to as immaterial. We can get into a long line of examination with respect to something that happened which is all subsequent to the filng of Freeman. There is no showing at all here that this was made independent of Freeman.

The Court: I will let it be received.

Mr. Moore: Q. I understand you to have said you studied the claims of the Freeman patent. Is there any obvious grouping of the claims; that is, do they fall naturally into two different groups or more?

A. Yes, I would say that the ten claims may be divided into two groups.

352 Q. And what would you consider the first group?

A. I would consider the first group being those claims in what is defined as two of the elements—

Q. Take this Freeman showing—

A. (Continuing.)—the furnace thermostats, 23-24. The second group would consist of those claims in which there is specified three elements or included in the three elements comprising the room thermostat 18 and the furnace thermostats 23 and 24.

Q. What claims fall under group 1?

A. Group 1 would include claims 1, 2, 3, 6, 7 and 8.

Q. Now, I understand those claims, you say, specify the two thermostats responsive to temperature within the furnace and do not include the room thermostat, is that right?

A. Yes, sir.

The Court: You say claims 1, 2, 3, 6, 7 and 8?

The Witness: Yes, sir.

Mr. Moore: Claims 1, 2, 3, 6, 7 and 8, that is right.

The Court: What do they do?

Mr. Moore: They omit the room thermostat in the combination.

Q. Then claims 4, 5, 9 and 10, as I understand, include the combination of the room thermostat, the limit con-

353 trol and the fan control, is that right?

A. That is correct.

The Court: What do they do?

Mr. Moore: They include the combination of the three elements, ...e room thermostat, the limit control and the fan control.

Q. Mr. Black, is the M-52 Mercoid stoker and fan control shown on this diagram, Mercoid Exhibit BB-1, the same as the M-52 which was illustrated and described in the Bulletin S-83 of 1929, Mercoid Exhibit Z?

A. Yes, sir. The figure M-52 is illustrated in that bulletin. We also have the physical exhibit Mercoid Exhibit OOO-2.

Mr. Freeman: That Exhibit OOO-2 is, of course, of recent origin. It is not one of the devices that was made back in 1929.

Mr. Moore: The record shows that that was taken from the stock of the Mercoid Corporation.

Mr. Freeman: Recent stock.

Mr. Moore: Recently.

Q. Now, I show you here Mercoid combination fan and limit control for warm air furnaces, Bulletin M-12, marked for identification Mercoid Exhibit CC. There is a picture on the first page of this bulletin. Does that illustrate 354 the Mercoid combination fan and limit control?

A. Yes, sir.

Q. That is the M-80, is it not?

A. Yes. A specimen of the physical exhibit appears in court as Mercoid Exhibit PPP.

Q. On the rear of that bulletin there are some pictures. One is indicated as a limit control and there is a description of the limit control under limit or band control. It states that the Mercoid type M-51 limit control has all the outstanding features of the fan control. Is that a picture of the M-51 physical exhibit that you have here in court?

A. Are you referring to the row of illustrations, the second on that—

Q. From the top on the left hand side?

A. Yes, that illustration was one of the M-51 controls, Mercoid physical Exhibit OOO.

Q. And on the right hand column directly opposite there is a picture entitled "Fan Control" and there is a description under separate limit or fan control reading "The type M-53 fan control is very popular with the warm air heating trade." Now, is that a picture of the M-53 fan control of which you have a physical exhibit there?

355 A. Yes, the exhibit referred to is Mercoid Exhibit OOO-2.

Q. And I believe there has been introduced in evidence a physical exhibit of the M-80 control, which is described in this bulletin, is that correct?

A. Yes, sir. I identified that before.

Q. Have you explained to the court how this M-80 is constructed and how it operates?

A. I do not believe that I have.

Q. Can you do so very briefly?

A. Yes, sir.

Q. From the physical exhibits that you have there before you?

A. Yes, sir. An M-80 control includes in one casing the M-51 limit switch found in the M-51 control Mercoid Exhibit OOO and the M-53 fan switch forming a part of the Mercoid M-53 control, Mercoid Exhibit OOO-2.

As is found in the M-51 and M-53 each of these switches is mounted upon their own tiltable bracket, the limit switch being to the right and the fan switch to the left.

In the M-51 control there was provided a pair of adjustable pointers to determine the temperature at which the switch would be moved from one position to the other
356 position. Likewise in the M-53 the same construction of the M-51 was employed, so that you could set the temperature at which the switch may be closed and the temperature at which the switch may be opened.

In the M-80 control there is still retained the set of pointers or adjustments for the limit control to determine when it will—this is the limit control, the right switch—determine when it will close its circuit or open its circuit, and as in the M-53 there is in the M-80 the pair of adjustments by means of which you may determine at what temperature you wish the fan switch to operate.

In the M-80 control the operation or movement of these two sets of adjustments for moving the switch to on and off positions is actuated by a single bimetallic coil, so that the coil may rotate the adjusting means for each of the switches and operate each of the switches at the temperatures for which their respective adjustments have been determined.

So we have placed on the M-80 control in a single casing the mechanical elements found within the casing of the M-51 and the M-53 and actuating those elements by a single bimetallic coil.

So that whereas in the past an M-51 and an M-53
357 may be installed on the same heating furnace and the wires brought to each of the individual instruments, we can in the M-80 control bring all of the wires in a single casing and there connect them to the fan switch and the limit switch.

The function of the M-80 control is identical with the function, purpose and use of the M-51 and M-53 when used together.

Q. I am not sure whether I asked you Friday whether or not the name plate of the M-80 bears any patent numbers.

A. Yes, sir, it does.

Q. And does that include No. 1,834,288?

A. Yes, sir.

Q. Now, I notice that there is a wiring diagram on the back across the top of this bulletin and I show you here an enlarged photostat of this diagram with certain circuits shown in red and blue. Will you kindly point out to the court how the M-80 is hooked up in the diagram to the left of the three shown on this photostat?

A. I may first identify the combination fan and limit control, which is the article to the right in the drawing, above which appear the words "Mercoid Fan and Limit Control, Type M-80 and M-82."

In that device the limit switch, so designated, is con-
358 nected in the red circuit to a control for an oil burner or a stoker, so that if a high or excessive temperature is reached in the furnace the M-80 limit switch may open its circuit, thus cutting off the supply over the red wires of power to the burner motor.

Controlling the operation of the fan is the fan switch in the type M-80 control and as illustrated in this diagram it is in a blue circuit connected to the hot wire of the red circuit before that circuit enters or flows through the limit switch.

By connecting the fan switch ahead of the limit switch as illustrated in this diagram and then to the fan motor, the fan motor will operate whenever the fan switch has been closed, say, upon a rise to 200 degrees, and will remain in operation until the temperature in the furnace drops to the low setting, say, 140 degrees in the furnace.

This arrangement of the blue circuit is one which permits operation of the fan under high temperature conditions in

the furnace after the burner or the stoker has been shut down by the limit switch.

Also controlling operation of the burner or stoker motor is the room thermostat, identified here as Mercoid low voltage Sensatherm type H.

359 When the thermostat calls for heat in the room and closes its red circuit and the limit switch in the furnace thermostat is closed, then there is a complete energization of the red circuit to energize the burner or stoker motor

If a high temperature, 300 degrees, should be reached in the furnace, the limit switch may open its circuit, thus breaking the supply of energy over the red circuit to the burner or stoker motor, and it will stop.

During the operation of the burner or stoker, when the temperature of the furnace reaches 200 degrees, the fan switch will close, thus completing the blue circuit to the fan, so that when the limit switch at 300 degrees opens to stop the burner the fan continues to run and to force out this hot air.

Likewise in this arrangement when the room thermostat, upon being subjected, let us say, to this 74 degree temperature in the room, opens its circuit, it will break the red circuit to the stoker or burner motor and cause it to stop.

However, with the blue circuit arranged as shown in this diagram and with the temperature not having lowered to 140 degrees in the furnace, the fan switch will remain
360 closed and continue to operate the fan, although the room thermostat in this instance has stopped the burner, until the furnace temperature drops to the low setting, that is, 140 degrees, of the fan switch setting.

Q. Now, can you describe the circuits shown in red and blue in the diagram on the right, but do it as briefly as you can?

A. Referring to Mercoid Exhibit CC-1, the diagram third to the right, I shall say at the outset here that that drawing provides the same arrangement in operation as is provided in the diagram No. 3, Mercoid Exhibit BB-1.

The arrangement is this: When the room thermostat closes its circuit, that is as identified here the room thermostat Mercoid Sensatherm, it completes the red circuit shown in the drawing by energizing relay type V-2-105-110 and relay type JMV or TV-2.

When the room thermostat at 72 closes its switch, the red circuit is completed through the limit switch in the control mounted in the furnace bonnet type M80 and thence to

the stoker motor, so that the stoker motor operates and accelerates combustion.

With a temperature lower than 140 degrees in the furnace, the fan switch of the M-80 will be in open circuit position, so at this time the blue circuit is not completed
361 through the switch energized by the thermostat in relay type V-2-105-110.

As acceleration of combustion continues and the temperature in the furnace reaches 200, the fan switch of the M-80 control will close, thus completing the blue circuit, energizing the motor to supply heat to the room.

If through a period of combustion acceleration with these conditions prevailing, with the stoker and fan running, there should occur 300 degrees temperature in the furnace, the M-80 limit switch opens its switch, thus cutting off the supply of power in the red circuit to the stoker motor, stopping it and checking combustion.

Of course, the temperature being high in the furnace, the fan switch of the type M-80 control remains closed, so that with the thermostat still demanding heat the fan continues to run.

As the temperature recedes in the furnace, let us say, to 250 degrees, the limit switch of the M-80 control will be restored to its closed position, thus again energizing the red circuit, starting the stoker motor and accelerating combustion.

When through a period of operation of the furnace in delivering heat to the room the room temperature reaches
74 degrees, the room thermostat will open its switch,
362 thus deenergizing type V-2-105-110 relay, likewise type JMV or type TV-2 relay, thereby both the red and blue circuits are broken, thus stopping both the stoker motor and the fan motor.

Mr. Moore: This diagram has not been introduced in evidence. I ask that it be introduced as MERCOID PHYSICAL EXHIBIT CC-1.

(The diagram was so marked.)

Mr. Moore: Q. Am I to understand from your description that the duties of the M-51 and M-53 Mercoid controls in diagram No. 3, Mercoid Exhibit BB-1, correspond to the duties of the M-80 control in the right-hand diagram of Mercoid Exhibit CC-1?

A. Yes, sir.

363 Q. Referring to interference No. 63,146, between the Freeman patent and the Jones application, a certi-

fied copy of which was introduced in evidence as Mercoid Exhibit TT, do you know whether or not that Jones application ever became a patent?

A. Yes, it did.

Q. And what is the number of it?

A. The patent is numbered 1,991,680.

Mr. Moore: A copy of the D. J. Jones patent No. 1,991,680 is offered in evidence as MERCOID EXHIBIT BBB.

(The patent was so marked.)

Mr. Freeman: That is objected to again for the same reason that it shows on its face that it was filed subsequent to the filing of the Freeman patent.

The Court: What is the theory? I do not understand the theory.

Mr. Moore: Your Honor, after the Freeman patent was granted an interference was declared between the patent and this man Jones, and Freeman won the decision on claims 2 and 5. Now, this patent was issued and it has a claim in there which I want to call to the court's attention which covers the two switches operated by a single thermostatic element, which is not shown in the Freeman patent and, therefore, limits the claims of the Freeman patent to the construction he showed in his original patent office 364 drawings.

The Court: Say that again. What is this interference?

Mr. Moore: The interference was with this Jones patent. You have a copy of that patent in the book, your Honor. It was set up as part of the prior art in the answer, and it was declared when its application was pending with the Freeman patent.

The Court: Yes, go ahead.

Mr. Moore: And after the interference was settled, the Jones patent was granted with claim 9, which claims the combination operates for controlling the rate of combustion and the rate of supply of a heat-conducting medium, a single thermostatic apparatus responsive to furnace temperature, and connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to check combustion and substantially simultaneously supply said medium when furnace temperature exceeds a predetermined degree.

Now that shows, your Honor, that Jones was entitled to claim independent of the invention of Freeman an instrument similar to the M-80 here, and that claim by the Patent

Office allowing Jones a claim for the two switches operated by a single thermostatic element limits the scope of the Freeman claims to now be expanded to cover that
365 structure, which is the accused device.

The Court: I do not think it eliminates the claim. It is an authority, perhaps. I do not see it limits them. It is just an authority to somebody entitled to whatever credit it is entitled to. I do not see how it limits them unless there is some concession.

Mr. Moore: They were in interference. The Patent Office declared these two inventions in interference, and it took the claims of the patent in suit.

The Court: Well, what happened in the contest?

Mr. Moore: There were only two claims involved in the contest.

The Court: What were the claims?

Mr. Moore: Claims 2 and 5 of the Freeman patent. Now, they won the interference so Jones did not get the claims.

Mr. Freeman: If anything, your Honor, the Jones patent shows that the Patent Office thought that it made no difference whether you had two separate switches or a single control device, because, after all, when you declare an interference it has to be upon some common concept.

The Court: That is not the point that counsel is talking about. He talks about a limitation.

Mr. Freeman: I have never heard of that before in any patent case I ever have been in.

366 The Court: How could there be a limitation? What claims are they?

Mr. Moore: Claims 2 and 5 of the Freeman patent.

The Court: I do not see any limitation in two. What is the other one?

Mr. Moore: Five.

The Court: Isn't the English of that claim messed up?

Mr. Moore: Sir?

The Court: Is the English of that claim mixed up?

Mr. Moore: Claim 9?

The Court: Yes.

Mr. Moore: It follows very closely the terminology of the claims in the Freeman patent.

The Court: But the last three lines, I do not know what the last two lines and a half mean.

Mr. Moore: "Said control apparatus operates to check combustion and substantially simultaneously supply said medium when furnace temperature exceeds predetermined

degree." In other words, the limit switch opens and the fan switch—

The Court: I cannot make anything out of that.

Mr. Moore: It is rather involved.

Q. Have you studied that claim 9 of the Freeman patent?

A. Yes.

367 Mr. Freeman: Of the Freeman patent?

Mr. Moore: I don't mean that. The Jones patent.

The Witness: The Jones you were referring to.

Mr. Moore: Q. I mean the Jones patent. Can you explain that better to the court?

The Court: I do not see why we fuss about the Jones patent. There are only two claims in contest and I do not see that that helps us any.

Mr. Freeman: That contest was decided in favor of Freeman, as Mr. Moore has already said, so as between Jones and Freeman, Freeman was prior and the Patent Office so determined.

The Court: If there was some other claim there in Jones with respect to which the examiner might have made a declaration, that is one thing, but he didn't. All the effect of that would be is that it is just what that examiner thinks. That is what it would mean.

Mr. Moore: Now, your Honor, I would like to call your attention to—

The Court: Just what he thought about that claim 9, I do not know.

Mr. Moore: This Jones patent shows a casing with a switching means within it controlling not less than two circuits.

368 The Court: Are you now trying to make the point that because there are two devices combined in one that it is different from where there are two separate devices?

Mr. Moore: Two separate devices are shown distinct, and in Jones they are shown as one instrument.

The Court: And you are contending to the court that that is a different proposition?

Mr. Moore: That is a different proposition.

The Court: Well, you have a great burden with you with this judge at this moment.

Mr. Moore: I think as the evidence progresses, your Honor will see the point I am making here. May the patent be received?

The Court: Yes. I do not know just why, but I will receive it. Have you the interference record here?

Mr. Moore: Yes, your Honor.

Mr. Freeman: No, you have the interference decision.

Mr. Moore: Yes, the decision.

Mr. Freeman: But not the record.

Mr. Moore: Just the decision, that is all I am relying on. I do not want to go into a lot of detail in this patent, because the main purpose of showing your Honor is this, that Minneapolis-Honeywell has granted licenses to five licensees and submitted one to Mercoid, and they de-
369 fined a combination furnace control in that license for which they wanted Mercoid to pay a royalty and upon which the other five did pay royalties, and that definition reads directly upon the disclosure in this Jones patent.

Mr. Freeman: And we say it reads on the M-80, which is here charged to be the instrumentality furnished by Mercoid with its instruction sheets that enables Mercoid to give to the world a device which when used as Mercoid intends it to be used constitutes a complete embodiment of the Freeman sequence of operation as covered in the Freeman claims, and that is why we are in court.

Mr. Moore: And that is up to your expert to prove.

The Court: Let us get along as fast as we can.

Mr. Moore: I do not want to take up a lot of the court's time, but Fig. 1 of the Freeman patent does disclose a unitary structure.

Mr. Freeman: You are talking about Jones now?

Mr. Moore: I am talking about Fig. 1 of Jones. You have Fig. 1 there of Jones, Mr. Black.

Mr. Freeman: And again, your Honor, we object to that line of examination. It is absolutely immatrial. The definition outlined in the agreement speaks for itself.

Mr. Moore: Yes, and if that definition outlined in
370 the agreement was in use by Mercoid prior to the filing date of the Freeman patent, Freeman has no right to require Mercoid to pay a license on his instrument.

Mr. Freeman: Mercoid never took a license and never paid, so it was not hurt.

Mr. Moore: Mercoid does not want to take one now and pay one now, either.

Mr. Freeman: That is apparent from the fact that you are in court.

The Court: Let us get along as fast as we can.

Mr. Moore: Q. Minneapolis-Honeywell took the deposition of Mr. McCabe some time ago and asked him to produce certain wiring diagrams and he referred to letters in the Mercoid files as being word pictures of the wiring diagrams. Now, Mr. Black, have you searched in the Mercoid sales files for word pictures of wiring diagrams?

A. Yes, sir, I have.

Q. And were you able to find any?

A. Yes.

Q. How did you select this correspondence?

A. I went through the correspondence files to find such correspondence that disclosed the application of furnace fan and furnace limit controls in the manner claimed by the Freeman patent.

371 Q. Can you produce the earliest correspondence that you found?

A. Yes. I have correspondence here between the Peninsula Burner & Oil Company and the Federal Gauge Company.

Q. I note the letter you have in your hand there is dated January 14, 1926. It is addressed to the Federal Gauge Company and it is from the Peninsula Burner & Oil Company of San Francisco. This letter asks the question in the following manner:

"Gentlemen:

"We have just figured a hot air furnace job in which we will have to use a booster fan. This fan, in our opinion, should be actuated by the furnace itself and should come into action after the furnace has been heated, that is to say, sometime after the fire actually starts.

"The problem is, therefore, to get a furnacestat of standard voltage such as shown on page 22 of the Honeywell catalog. If you have such an instrument, kindly send us one and we will submit it to the architect of the job for approval."

Now, what was the next piece of correspondence you found?

A. A reply to that letter dated January 19, 1926.

Q. This reply reads:

372 "Gentlemen:

"We have your favor of the 14th regarding a hot air furnace job hook-up with a booster fan, and would advise that our Figure 50 furnace control as shown on Bulletin E-2 enclosed may be used for this purpose. It will be necessary for you, however, to advise us the point

at which this instrument is to cut in and start the motor, and at what point you desire it to cut out."

Now, what next did you find?

A. I found a letter from Peninsula dated January 23, 1926.

Q. That letter reads:

"Referring to our request for a control such as shown on your Bulletin E-2, Figure 50, please be advised that it it is our intention to use this instrument in connection with a booster fan and its purpose is to start the fan after the furnace has attained sufficient heat to prevent cold air being blown into the house and to stop the fan at such a time after the burner quits operating that the temperature falls so low in the furnace that is is no longer desirable to have the fan running. The writer is satisfied, after speaking with your Mr. Matthews, that your Figure 50 with a reversed tube will accomplish this job, and urges that one be forwarded immediately by parcel post."

What was the next letter in the correspondence?

A. There followed that a letter written by the Federal Gauge Company to Peninsula, which is dated January 29, 1926.

373 Q. This letter reads:

"Referring to your order of January 23rd, please note that our Engineering Department recommends sending you two controls, one set 200 degrees to 140 degrees, and the other one 250 degrees to 300 degrees, the first instrument to be set to cut in when the temperature in the dome of the furnace reaches 200 degrees, and remain in contact until the temperature has dropped to 140 degrees.

"This instrument will withstand a maximum temperature of 350 degrees without damage. At 340 degrees the question of fire hazard arises due to the accumulation of lint and dust in the air ducts and around the registers. For that reason our Engineering Department recommends sending you the second instrument as a safety limiting device set to cut in at 250 degrees and out at 360 degrees which will afford protection not only for the fan controlling instrument but also against the fire hazard."

And did you find any other reference to that?

A. Yes; I found a copy of the Mercoid order upon which there is shown the furnace control range 200 to 140 degrees for booster fan and furnace control 250 degrees to 300 degrees for furnace control, shipped to Peninsula

Buner & Oil Company, 885 Harrison Street, San Francisco, California.

Q. Is there a shipping stamp on that order?

A. At the lower bottom of this sheet appears the Federal Gauge Company shipping stamp with the date 374 January 30, 1926.

Q. I note you have the original correspondence in your hand. Where did this come from?

A. This came from the files of The Mercoid Corporation.

Mr. Moore: The correspondence just referred to by the witness, being a letter from the Peninsula Burner & Oil Company to the Federal Gauge Company, dated January 14 and January 23, and the Federal Gauge replies dated January 19 and January 29, all during the year 1926, and the Mercoid order referred to by the witness, I ask be marked for identification as MERCOID EXHIBIT CCC.

(The documents were so marked.)

Mr. Moore: Q. Can you produce a copy of this Bulletin E-2 that is referred to in this correspondence?

A. Yes, sir. I have here Mercoid Bulletin E-2, dated December, 1925.

Mr. Moore: This Bulletin E-2, December, 1925, has been already marked for identification as Mercoid Exhibit DD.

The Witness: A. I may say that upon the back or fourth page of this bulletin there appears the Figure 50 Federal Mercoid furnace control which was referred to in the Peninsula correspondence.

Q. Now, is this Bulletin E-2 similar to Bulletin E-1924, Mercoid Exhibit V? That was introduced and marked 375 for identification, rather, by Mr. Courteol as Exhibit V.

A. Yes. These bulletins are similar. The Bulletin 1925 is a reprint. Apparently the only changes are in the list prices.

Mr. Moore: This Bulletin E-2, which the witness has just referred to, was not marked for identification heretofore, and I request it now be marked for identification as MERCOID EXHIBIT DD.

(The document was so marked.)

Mr. Freeman: Why don't you offer it? We do not object to that bulletin. Offer it and get it over with.

Mr. Moore: Well, you do to some of the others and you asked to have them positively identified. Mr. Courteol identified a lot of them. So I am going to call Mr. Owens and have him identify them properly.

Mr. Freeman: I am sorry.

Mr. Moore: Q. Now, Mr. Black, will you please explain your reasons for selecting this particular correspondence as describing the invention claimed in the Freeman patent?

A. The request in this correspondence, as indicated in the first letter of January 14th from Peninsula, asked for a control actuated by the furnace temperature which would come into action after the furnace had been heated to start the fan, and as Peninsula in their letter of January
376 23rd went further to say, "It is our intention to use this instrument in connection with a booster fan and its purpose is to start the fan after the furnace has attained sufficient heat to prevent cold air being blown into the house and to stop the fan at such time after the burner quits operating that the temperature falls so low in the furnace that it is no longer desirable to have the fan running."

I should like to stress particularly here the statement "to stop the fan at such time after the burner quits operating," indicating that after the burner has been shut down for any reason they still wished the fan to run until the temperature falls so low in the furnace that it is no longer desirable to have the fan running.

Mr. Freeman: Just where do you get that "for any reason"?

Mr. Moore: May it please, your Honor, I object to Mr. Freeman interfering with the witness while he is on the stand. He has a right to ask him on cross-examination. I do not know what his idea is at the present time, whether it is his impatience, or whether he is trying to confuse the witness.

The Court: You do not want a ruling, do you? Go ahead.

The Witness: A. Referring to the Federal letter to
377 Peninsula, January 29, the recommendation here is for the use of two controls, one set 200 to 140 degrees, and the other 250 to 300 degrees, the first instrument to cut in when the temperature in the dome of the furnace reaches 200 degrees and remain in contact until the temperature has dropped to 140 degrees. That answers the call for the fan control to control the operation of the fan.

Also recommended was the second instrument, which was to serve as a safety limit device set to cut in at 250 degrees and out at 300 degrees. Now, as a limit device it would function at 300 degrees to stop the burner, and since in the letter of Peninsula, dated January 23, they state:

"to stop the fan at such a time after the burner quits operating that the temperature falls so low in the furnace that it is no longer desirable to have the fan running," it is obvious that if the limit control functions to stop the burner they wished the fan control to permit operation of the fan, so if the burner quits operating because the high temperature of 300 degrees causes the limit control to function and stop the burner, they desire that the fan continue to operate until the temperature falls so low in the furnace that it is no longer desirable to have the fan running, so the fan would continue to run after the
378 burner quit operating until a low setting of 140 degrees was reached.

Mr. Moore: Q. Now, to the best of your knowledge and from your recent inspection of the Mercoid records, what is the first wiring diagram you found which answers the description you have just given?

A. The first publication of a wiring diagram which carries out the use of a fan and limit control so defined and disclosed in the Peninsula Burner correspondence is that in the bulletin form P-55, dated September, 1934.

Q. I call your attention to general wiring diagrams at the bottom thereof and to an enlarged photostat of this wiring diagram with the circuit shown in blue and red. Could you point out in that wiring diagram wherein you found the elements described in this letter?

A. Yes. The elements defined in the letter comprise a burner motor so designated in this drawing, and a fan motor so designated in this drawing; also a limit control, so identified in this drawing as type M-51, and a fan control identified in this drawing as type M-53.

As shown in red upon this drawing, Mercoid Exhibit EE-1, there is interposed in that circuit the limit control type M-51, so that if the room thermostat, designated
379 as type H, closes its switch the red circuit will be completed through the limit control M-51 to the burner motor to actuate it. If through a period of operation 300 degrees should be reached, then the limit control M-51 would open its switch, thus deenergizing the supply,—cutting off the supply of electric power in the red circuit to the burner motor, whereupon it would stop operation.

The fan circuit in this drawing, which was illustrated in blue, is connected directly in the hot line, or to the hot line, where it then passes through the M-53 control to the fan and back to the other side of the line. The only con-

trol in this blue circuit is the fan control, so that if combustion is taking place in the furnace, and we reach 200 degrees, the M-53 will close its switch, completing the blue circuit to the fan, and it will operate.

Now, in the event that the red circuit is interrupted by the limit control so that we stop the burner, whereas the letter of Peninsula stated the burner quits operating, we nevertheless can still maintain the blue circuit to the fan motor, because we have high temperatures in the furnace. So that in this arrangement, after the burner has stopped operating, the fan may continue to run until the tem-
380 perature falls so low in the furnace, 140 degrees, that it is no longer desirable to circulate that air.

This diagram shows in the form of a diagram what was expressed as desired and what was recommended for the use of a fan and limit control, wherein the fan may operate after the burner quits operating as a result of the limit control opening its circuit until the temperature falls so low in the furnace you do not want to supply any more air at that temperature.

Mr. Moore: This wiring diagram has already been marked for identification as Mercoid Exhibit EE, and I offer the enlarged photostat with the colored wiring as MERCOID PHYSICAL EXHIBIT EE-1.

(The wiring diagram was so marked.)

The Witness: If I may make a statement here, Friday when I referred to Mercoid Exhibit YY and discussed the system and differences between that drawing and the enlarged Figure 2 of Freeman VV following some discussion, I pointed out how the change of one wire in Figure 2, Exhibit VV, namely, 28 to 31, would then give you what is represented in Mercoid Exhibit YY, and I should like at this time, now having finished explaining the drawing illustrated in Mercoid Exhibit EE-1, show by a simple
381 change of one wire in Figure 2 of the Freeman patent, Mercoid Exhibit VV, we then produce the arrangement disclosed by the correspondence with Peninsula in 1926, and exemplified by Mercoid Exhibit EE-1. That would consist of again removing wire 28 from the thermostat 18 and connecting it to wire 27.

382 Q. Can you indicate in red pencil on Exhibit VV just what you have described?

The Court: Q. Do you have a red pencil?

A. Yes, sir.

Q. You are going to make Fig. 2 of the Freeman patent the same as what?

A. As Mercoid EE-1, which carries out the disclosure of the Peninsula correspondence.

Q. By striking out the line by means of a red pencil and putting in a red line, it being understood the blue line will be eliminated. No, no, leave the blue line. I know what that means.

A. I have to work on the same line.

Q. You have eliminated that line, haven't you?

A. All right.

Q. And run a red line over here?

A. Yes, sir.

Q. When you consider the wiring with the red in it, you eliminate the blue from your mind, and when you consider the wiring system with the blue in it, you eliminate the red from your mind?

A. Yes, sir.

Q. And in each case you eliminate the line 28?

A. Yes, sir.

383 Q. Blue is which one?

A. Exhibit YY.

Q. And the red is Exhibit what?

A. EE-1. Incidentally, that Exhibit EE-1 is associated with that Peninsula correspondence.

The Court: That is form P-55.

The Witness: It is tied up with this Peninsula correspondence exhibit.

The Court: Yes, and it is form P-55.

Mr. Moore: P-55; 1934.

Q. Now, referring to form P-55, Mercoid Exhibit EE-1, and the colored wiring diagram of Mercoid Bulletin M-12, Mercoid Exhibit CC-1, is there any similarity in the connections shown in form P-55, which you state is a diagram as described in the Peninsula correspondence, and this later showing in Mercoid Exhibit CC-1?

A. Yes, sir, there is. The colored portion of Mercoid Exhibit EE-1 provides a control arrangement that is duplicated in the left hand colored diagram of Mercoid Exhibit CC-1. I will endeavor to point out the similarity as briefly as I can.

In the Exhibit EE-1 we employ individual devices for controlling the fan and the burner, the burner being controlled by the M-51 and the fan by the M-53, separate

384 devices. We accomplish the same result in the left drawing, Mercoid Exhibit CC-1, by utilizing the type M-80 control, in which there is included in the single instrument the fan and the limit switch. It is to be noted in both drawings to which I refer that the red circuit passes through the limit switch to complete the circuit to the burner.

Mr. Freeman: We will concede the circuit on Mercoid Exhibit EE-1, form P-55, in 1934 corresponds, so far as sequence of operation is concerned, to the circuit illustrated in the diagram on the left of Exhibit CC-1.

The Witness: Then, the main difference being where we use single instruments here to accomplish that result, or individual instruments here, namely, M-51 and M-53, in this bulletin these two switches are combined in one casing and bear identification type M-80.

The Court: Very well.

Mr. Moore: Q. What was the next correspondence that you found relating to this subject matter?

A. I found correspondence with the Miller Automatic Services, Fond du Lac, Wisconsin, and the Federal Gauge Company.

Mr. Moore: Now, this letter of October 18, 1926, from Miller Automatic Services to Federal Gauge Com-
385 pany reads as follows:

"We have in mind an oil fired hot air job in a church which uses a blower system to force the hot air into the church.

"The blower is equipped with a 220 volt, 3 phase, 2½ horse power motor. We would like to equip this job with an air-stat in the top of the furnace so that the blower would automatically start when the temperature got up to a certain point and would automatically stop when the temperature in the hot air duct dropped to a predetermined point.

"If you can furnish us such equipment, please advise us and quote us prices."

To this letter is attached a carbon of a reply by the Federal Gauge, dated October 20, 1926:

"We have your favor of the 18th and are pleased to enclose a copy of our Bulletin E-2, and would advise, that we are in a position to furnish our Figure 50 furnace control, set to cut in at 190°, and capable of withstanding a temperature of 300°, and to cut out at 140°, for use in connection with a starting switch to operate the blower

motor, in the event that this motor is going to be larger than 1 H.P."

It quotes the list price.

"We would recommend, in addition to using the furnace control for starting and stopping the motor driven fan, that you employ a furnace control set to cut out at not over 300° temperature in order to protect the fan control and the installation itself from overheating."

386 Now, there is a reply on the Miller Automatic Services stationery dated November 13, 1926, which reads:

"Please ship us one Figure 50 Furnace Control set to cut in at 190° degrees and cut out at 140°, this control to be capable of withstanding a temperature of 300°.

"These specifications are in accordance with your letter of October 20, 1926. We have gotten information from the Graybar Electric Company, and they recommend their catalog number CR7005-A4 enclosed magnetic starter for use in connection with a 1½ H.P., 3 phase, 220 volt, 60 cycle motor, with your furnace control.

"If you are familiar with this Graybar switch and it is not the correct one for us to use, please advise us at once."

There is attached a carbon of the letter from the Federal Gauge to the Miller Automatic Services dated November 23, 1926, which reads:

"In reply to your letter of November 13th, we have from a factory a promise of shipment for the 18th on the control specified in the first paragraph of your letter. While we use Figure 50 on this we usually refer to the instrument as a Booster Fan Control due to the fact that the installation is usually made for forced circulation of air in connection with a hot air installation. The solder used in the construction of this instrument will stand up to 350° of heat and the operation of the instrument is as follows:

387 "When temperature surrounding the dome of a hot air installation reaches to 190° this control cuts in and starts the circulating fan, then if for any reason the fire should go out and the temperature surrounding the dome be reduced to 140 or less, the instrument will cut out, thus preventing the forced circulation of cold air through the ventilating ducts.

"We usually recommend the use of a limiting device with the use of the circulating fan, such as our Figure 50 Furnace Control set at 250 to 300 degrees the purpose of this being to prevent overheating of the furnace dome and

also due to the fact that at 340° there arises a fire hazard such as the taking fire of lint and dirt which may have accumulated in the ventilating ducts. As to the necessity of this Control, you are in the best position to judge."

Q. Now, why did you select this particular piece of correspondence?

A. Because there is recommended for use with a fan control a limit control. In the request made as to what was desired as the function of the fan control, the recommendation was for the use of a Figure 50 set to cut in at 190 degrees and to cut out at 140 degrees, which appears in the letter of October 20th.

In the letter of November 23rd the explanation made for the fan control is, "when temperature surrounding the dome of a hot air installation reaches to 190 degrees
388 this control cuts in and starts the circulating fan, then if for any reason the fire should go out and the temperature surrounding the dome be reduced to 140 degrees or less, the instrument will cut out."

Following this statement appears the recommendation for the limit control, which is to limit operation of the burner to establishing temperatures not in excess of 300 degrees in the furnace.

So when we read back to the preceding paragraph, which says that the fan control cuts in, and if for any reason the fire should go out, such as by way of example, the limit control stop the burner, which puts out the fire, the fan will continue to run until the temperature surrounding the dome be reduced to 140 degrees or less.

This request and recommendation made by the Federal Gauge for the use of two instruments defined in the correspondence discloses the same arrangement of those two instruments in a circuit, including a burner and a fan, set forth in the Peninsula correspondence.

Q. Does that correspond to any of these colored diagram circuits you have before you here?

A. Yes, sir. This correspondence defines an arrangement which appears in the Mercoid Exhibit EE-1, the
389 right hand colored diagram, and the left hand colored diagram of Mercoid Exhibit CC-1.

Mr. Moore: Photostatic copies of this correspondence with Miller Automatic Services dated October 18, 1926, addressed to the Federal Gauge Company; Miller Automatic Services letter of November 13, 1926, addressed to Federal Gauge Company; the Federal Gauge Company reply

dated October 20, 1926, and November 22, 1926, are asked to be marked for identification as MERCOID EXHIBIT DDD.

(The documents were so marked.)

Mr. Moore: Q. What was the next piece of correspondence you found along these lines?

A. I found a letter addressed to the Premier Warm Air Heater Co., Dowagiac, Michigan, under date of April 22, 1927.

Mr. Moore: Now, this is a carbon of a letter dated April 22, 1927, from the Federal Gauge Company to the Premier Warm Air Heater Co., and reads as follows:

"In reply to your letter of April 20th perhaps an explanation of the function of the Figure 50 Furnace Control will assist you to a better understanding of its operation. The range 250 to 300 degrees represents a safety—preventing the burner from operating to produce a temperature higher than 300 degrees surrounding the dome.

390 At a point approximately 340 to 350 degrees Fahrenheit there arises a fire hazard due to the inflammability of lint and dust which may have collected in the air ducts. This then puts the Figure 50 in the position of a limiting device.

"For forced circulation by means of booster fans we make a similarly constructed Control but instead of cutting in at the low and out at the high—the operation is just the reverse, the range being between 140 to 200 degrees. This instrument will not cut in and start the booster fan until the temperature surrounding the dome has reached approximately 200 degrees, thus preventing the blowing of cold air through the ducts before the furnace has heated up to a point sufficient to furnish the necessary warm air. If for any reason the burner stops or the flame goes out when the temperature surrounding the dome drops to 140 degrees, this control will cut out and stop the booster fan again preventing the blowing of cold air through the circulating ducts.

"We believe this latter Control, known as the Figure 50 Booster Fan Control, will better meet your requirements. If possible, we suggest the use of both—the former as the limiting device and the latter as the Fan Control. Have we made ourselves entirely clear to your satisfaction."

Mr. Moore: Q. Now, why did you select this letter?

A. This, like the previous correspondence, recommends,

the use of a fan control and a limit control. And I think I may just simply state here the arrangement being that
the fan control will permit operation of the fan, if for
391 any reason the burner stops, as by way of example,
the limit control opening the burner circuit. When the temperature afterwards drops to 140 degrees, then the fan control will stop the fan. So we have here the operation of the limit control to stop the burner, which does not stop the fan, and a fan thereafter continues to operate until the temperatures surrounding the dome drops to 140 degrees.

Q. Now, do any of these colored wiring diagrams illustrate the circuit you have just referred to.

A. Yes; the same two diagrams I previously referred to.

Mr. Moore: A photostat of this letter dated April 22, 1927, from the Federal Gauge Company to Premier Warm Air Heater Company is asked to be marked for identification MERCOID EXHIBIT EEE.

(The photostat was so marked.)

Mr. Moore: Q. What was the next piece of correspondence you found along these lines?

A. I have a letter written to Socony Burner Corporation, 300 Central Avenue, Albany, New York, under date of December 21, 1927.

Mr. Moore: This is a carbon copy of a letter written by the Federal Gauge Company to the Socony Burner Corporation on December 20, 1927, which reads as follows:
392 "At the request of our special representative, Mr.
A. W. Barr, we are enclosing a copy of our heating catalog, and wish to call your attention to our Figure 50 furnace control which we are in a position to furnish with the special range for booster fan application. This control when used for this work is supplied with a range of 190 to 140 degrees, cutting in at the high point and breaking the circuit on a drop in temperature to 140. The expansion element or bourdon tube is capable of withstanding a maximum temperature of 350.

"We recommend in each and every instance where a booster fan control is supplied, that a regular Figure 50 furnace control be also used as a limiting device, set to cut out when the temperature in the hood above the dome reaches the temperature of 300 degrees, restoring the circuit on a drop in temperature to 250."

Q. Now, why did you select this letter?

A. For the same reasons I selected the earlier corre-

spondence, because there is recommended here the use of a fan control and a limit control, wherein the limit control is recommended at 300 degrees to stop the burner, and wherein even though that occurs the fan control will continue operation of the fan until the temperature drops to 140 degrees.

Q. Do you find that circuit exemplified in any of these colored wiring diagrams before you?

A. Yes; the same circuit that I referred to before
393 in Mercoid Exhibits EE-1 and CC-1.

Mr. Moore: A photostat of this correspondence addressed to the Socony Burner Corporation, dated December 20, 1927, is asked to be marked for identification as MERCOID EXHIBIT FFF.

(The photostat was so marked.)

394 Q. What was the next letter that you found that you considered a word picture of the wiring diagram?

A. I found a letter from the 20th Century Heating and Ventilating Company of Topeka, Kansas, and attached thereto a reply made by the Mercoid Corporation.

Q. Why did you select that letter?

395 A. This letter, like the others, or these two letters, like the others, disclosed the use of a fan and limit control where, referring to the Mercoid letter of September 14, 1928, recommendation is made for using the Figure 50 control with standard range 250 to 300 degrees, mounted in the drum of a furnace and connected in the line ahead of all other controls, thus that control at high temperatures would operate to shut down the burner.

The next paragraph refers to the furnace fan control and stated that as regards the furnace fan the same type of control is used, but with a range 190 to 140 degrees, to cut in at high and off at low; the fan will not start until the dome reaches a temperature of 190 degrees and will continue to run after the burner is off, until the temperature in the dome drops to 140 degrees, thus using the latent heat of the furnace.

Thus this shows that when the limit control shuts down the burner that the fan control will permit continued operation of the fan to use the latent heat of the furnace, operation of the fan ceasing when the furnace temperatutre drops to 140 degrees.

A. And do you find that description also exemplified in the wiring diagram that you have heretofore referred
396 to?

A. Yes, sir.

Q. That is the wiring diagram Form P-55, September, 1934, Mercoid Exhibit EE-1?

A. Yes, and as further exemplified by Mercoid Exhibit CC-1, the left hand diagram.

Mr. Moore: Photostatic copy of letter from the 20th Century Heating and Ventilating Company, Topeka, Kansas, dated September 10, 1928, to The Mercoid Corporation, and the Mercoid reply thereto, dated September 14, 1928, are asked to be marked for identification as MERCOID EXHIBIT GGG.

(The documents were so marked.)

Mr. Freeman: Those letters were already in as Exhibit K-2 in the depositions. You can put them in again, if you want.

Mr. Moore: Some of them are and some are not. It will just mix things up to take them out of their regular order.

Mr. Freeman: We are going to have two different exhibit numbers applicable to the same exhibit then.

Mr. Moore: They are in the depositions, I believe, are they not?

Mr. Freeman: They are in Exhibit K-2.

397 Mr. Moore: I do not intend to introduce them, unless you do.

Q. Did you find another letter?

A. Yes. I have a letter from the Holland Furnace Company of Beloit, Wisconsin, dated January 11, 1929, and a reply made by The Mercoid Corporation under date of January 15, 1929.

This correspondence, like the other, discloses the same use of the furnace control which will operate the fan after the burner motor has been stopped, to take from the furnace the heated air until the temperature at that point lowers to 140 degrees.

I shall read from the letter of January 11th, in which in the second paragraph it says that:

"A switch to start the fan after the temperature in the casing or hood has reached a high point and to continue to run until the burner has shut off and all the heat made is delivered to the rooms."

Incidentally, in the letter of January 15th the second paragraph states:

"This control should be wired independent of the thermostat circuit in order for it to operate satisfactorily."

That is exactly what is shown in the diagram of Mercoid Exhibit EE-1, which is colored, and the left colored
398 diagram of Mercoid Exhibit CC-1.

Mr. Moore: Photostat of the Holland Furnace Company letter dated January 11, 1929, and addressed to the Mercoid Corporation, and the Mercoid reply dated January 15, 1929, are asked to be marked for identification MERCOID EXHIBIT HHH.

(The documents were so marked.)

The Witness: Summing up this correspondence that I have been referring to, we find that it discloses the use of a limit control and a fan control, wherein the stopping of the burner by the limit control permits the fan to run through the fan switch until the temperature in the furnace lowers to the low setting of the fan switch, and that form of operation is what I understood counsel for Minneapolis-Honeywell to state represented the novelty of the Freeman invention.

Mr. Moore: Q. Now, have you compared any of the claims of the Freeman patent with the disclosures of these letters of 1926, 1927, 1928 and 1929, as exemplified by the wiring diagram on Form P-55 of 1934, Mercoid Exhibit EE-1?

A. Yes, sir.

Q. Do you find that any of the claims of the Freeman patent read on that diagram?

399 A. Yes, all claims that I classified earlier as being in Group 1, that is the group which does not include the room thermostat.

Q. I believe Minneapolis-Honeywell is relying on claim 1. I will ask you if you can point out on this wiring diagram in Exhibit EE-1 the following elements of claim 1: Combination of apparatus for controlling the rate of combustion and the rate of supply of a heat inducting medium?

Mr. Freeman: If we can save any time we will concede that claim 1 of the patent reads upon Form P-55, Exhibit EE-1, the colored diagram also referred to by the number 962. We will concede that.

Mr. Moore: All right.

Mr. Freeman: If you are trying to prove that.

The Witness: That is likewise true of claims 2, 3, 6, 7 and 8.

Mr. Moore: Do you concede also that claims 2, 3, 6, 7 and 8 read on that diagram?

The Witness: That is all of the claims, without including the room thermostat.

Mr. Freeman: I concede that claim 6 reads on it. I am talking about the claims that we are relying on.

Mr. Moore: Yes, and I believe Mr. Black said the 400 second group included the room thermostat and he does not consider those letters to disclose that circuit.

Q. Now, in these circuits described in those letters, I think reference is made to the Figure 50 furnace control and fan control. I believe here in this diagram P-55, Exhibit EE-1, you show the M-51 and the M-53. The M-51 and M-53 are the same in function, are they, as the Figure 50?

A. Yes, sir. I drew comparisons between those two instruments as they are represented in Mercoid Exhibit Y.

Q. Could the M-80 be used in that same circuit?

A. Oh, yes. If the M-80 had existed at the time those drawings were made, it could have been used in there to perform the same function and make the operation that is accomplished by the separate devices.

Q. You say if it had been in existence. What caused it to come into existence, do you know, that is, the M-80?

A. I should say that the primary factor in the creation or embodiment in the one case of the M-51 and M-53 was brought about, to use a common term that is being employed quite often today, by the streamlining of heating plants, like we see most everything else is being streamlined. We have among the furnace manufacturers brought about—I should not say we have—there has been by 401 the furnace manufacturers brought about the creation of heating plants of more compact and attractive designs. From illustrations we can see in magazines and publications that they are quite cabinet in form.

So it was desirable from the heating manufacturers' standpoint to provide a minimum of places in which control appliances would be necessary to be mounted in this cabinet, and to also enhance its attractiveness it was desired to have one device with one mounting to give the operation which heretofore was given by the mounting of two separate devices, and not only would it enhance the appearance of the furnace but it would also cheapen the installation cost, and furthermore, with such a demand as that, it was possible in making this article to make it for less than it would cost the purchaser for the two individual items.

Q. That M-80 bears the same patent number as the M-51 and the M-52 and M-53, does it not?

Mr. Freeman: That has been asked for the third time.

The Witness: A. Yes, sir.

Mr. Moore: Q. In other words, the M-80 is not a different invention from the other devices?

Mr. Freeman: I object to that as leading.

The Court: Sustained.

402 Mr. Moore: Q. Now, referring again to your search of the Mercoid records for correspondence relating to the use of a furnace fan in the heating system in connection with a thermostat and a limit control, did you find any correspondence from customers which submitted wiring diagrams to Mercoid?

A. Yes, sir.

Q. What did you find?

A. I found correspondence with J. A. Portner of Wheaton, Illinois. This letter, of which I have a photostatic copy, is dated November 22, 1928.

Q. This letter states:

"Enclosed you will find proposed control scheme for the heating plant in my new show room, office and shop building now under construction. Can you furnish a thermostat in two circuits?"

Was there a wiring diagram attached to that letter?

A. Yes, sir, there was. The diagram appears on the letterhead of J. A. Portner.

Q. And did you find any other papers relating to this installation?

A. Yes, sir, I found a copy of a Mercoid Corporation shipping order designating controls which were speci-
403 fied on the wiring diagram submitted by Mr. Portner.

Mr. Moore: Photostatic copy of letter from J. A. Portner to the Mercoid Corporation, dated November 22, 1928, is asked to be marked for identification MERCOID EXHIBIT III.

(The photostatic copy of letter was so marked.)

Mr. Moore: Photostatic copy of wiring diagram on the Portner stationery accompanying this letter I ask be marked for identification MERCOID EXHIBIT JJJ.

(Photostatic copy of diagram so marked.)

Mr. Moore: I ask that the photostatic copy of the Mercoid shipping order be marked for identification as MERCOID EXHIBIT KKK.

(Photostatic copy of order so marked.)

Mr. Moore: Q. What does that shipping order call for?

A. This order lists the following items:

"1 Mercoid Figure 71 combination single pole single circuit 1 to 4 pound pressure control and low water cutoff.

"2 Mercoid Figure 35 single pole single circuit 110-200 degrees Risertherm.

"2 Mercoid 845-237 Figure 21 double pole single circuit 56-80 degree heating thermostat.

"1 adjustable connection bar $2^1/_4$ inch length for full automatic operation.

"1 ditto $2^1/_2$ inch long."

404 Q. Does that have a shipping stamp on it?

A. Yes, sir, there appears The Mercoid Corporation shipping stamp dated January 22, 1929.

Q. Have you considered this wiring diagram submitted with the Portner letter?

A. Yes, sir.

Q. Does that wiring diagram show the instruments which he refers to in his letter?

A. The letter itself does not disclose all of the instruments shown in the diagram, which are properly identified, however. The letter refers in the first paragraph: "Can you furnish a thermostat in two circuits." The drawing shows two articles in the upper center, with lines directed to each of them marked 21 spec.

To the right of the right hand thermostat is written "2 circuit thermostat," the word "Circuit" having been erased or cancelled and the word "pole" substituted.

The letter also refers to two unit heaters, which are shown at the very upper edge of the sheet, each bearing the designation "steam unit heater motor."

There is also in the third paragraph of the letter reference made to a G-2 control, which is in the very center of the drawing, at the top of or above the other marked G-2.

405 At the bottom of this Portner letter of November 22nd is a longhand notation signed by H. A. M., which is Mr. Matthews, who was a salesman for Mercoid at that time, in which he makes a suggestion that the Figure 71 replace the 612 specified in the drawing.

Directly above the oil burner motor is shown this 612 control. Mr. Matthews recommended the use of a Figure 71 in its place.

Q. Where is Mr. Matthews now?

A. Mr. Matthews is dead.

Q. I note this letter states that he wants these controls for the heating plant in his new show room and office and shop. Did you find any correspondence relating to this new show room?

A. Yes, sir. In this same correspondence I found an announcement made by J. A. Portner, 224 West Front Street, Wheaton, Illinois.

Q. That reads "This is announcement of the opening of our new show room and shop at 225 West Front Street. This is more significant than just the opening of another store in town." Did you find anything in this correspondence which showed when that announcement was sent out?

A. Yes, sir. There was a letter written by—the 406 initials show L. H. V. N.—Mr. Van Ness, president at that time, under date of March 5, 1929, offering his congratulations to Mr. Portner.

Q. That letter states: "Congratulations, please, upon your announcement which came in this morning. It is certainly gotten up well and I hope the Copeland people paid for it, as I observe no reference to oil burners."

Mr. Moore: This announcement and acknowledgment of the announcement, photostatic copy of which I have in my hand, I ask to be marked for identification as MERCOID EXHIBIT LLL.

(The documents were so marked.)

Mr. Moore: Q. Do you know personally whether or not Mr. Portner ever made the installation referred to in this correspondence of November 22, 1928, and the diagram attached thereto?

A. Yes, I saw the installation in his building.

Q. How long ago did you visit the building?

A. My first visit was in April of 1940, and I have made a few visits there since, the last being in the fall of 1941.

Q. I show you a photograph here marked "Establish-
407 ment of J. A. Portner, 225 West Front Street, Whea-
ton, Illinois, November 6, 1941," and at the lower right hand corner "No. 1." Can you identify that?

A. Yes.

Mr. Moore: These photographs are in your book there, your Honor, under the Portner installation.

The Court: Yes.

Mr. Moore: Q. Can you identify it?

A. Yes. This photograph marked No. 1 is a view looking into Mr. Portner's office. On the center column of the scene in the photograph is shown a Mercoid thermostat

having two mercury switches. At the upper left of the drawing or photograph we see some louvres or grill work at the end of the duct through which the warm air is injected into the front part of the store.

Mr. Moore: The photograph just referred to, identified by the symbol "No. 1" in the lower right hand corner, is asked to be marked for identification MERCOID EXHIBIT MMM-1.

(The photograph was so marked.)

Mr. Moore: Q. I show you another photograph, similarly marked with a No. 2 in the lower right hand corner, and ask you if you can identify that?

A. Yes. Photograph No. 2 is a view of the shop to the rear of his building as it would be seen looking from the doorway which leads to the front of the building. In
408 the lower left hand part of the photograph is the heating plant and to the upper right, close to the ceiling at the back, may be seen one of the unit heaters referred to. There are flaps or louvres there that are visible, for deflecting the air into the shop.

At the opposite side of this unit—

The Court: I cannot see the numbers.

Mr. Moore: He was referring to the numbers down in the corner.

The Court: What is at the top?

The Witness: The unit heater.

Mr. Moore: Right here, your Honor. (Indicating on photograph.)

The Court: What did you say they were?

The Witness: That is the unit heater. The motor for operating the fan which is part of the heater is visible—

The Court: In the far left hand corner of the room and not the upper left hand corner of the picture?

The Witness: In my answer did I say left, Mr. Reporter?

Mr. Moore: It is the upper right hand corner.

The Witness: The upper right hand corner, yes. May that be corrected?

Mr. Moore: Of the picture.

The Witness: Of the picture, is a unit heater. At
409 the back of the unit heater may be seen this black very black projection, which is the motor of the fan forming a part of the heater. A piece of pipe, which is black, and then becomes white, goes up to the ceiling, which

is the conduit which provides the electric connections to the motor.

Looking again at the heating plant, over against the wall is the pipe which first leaves the heater white up to the T, where it becomes black, and then goes back to the wall, and there there is a clamp-on control for what has been previously referred to as a Risertherm, clamped thereto, and it controls the operation of the fan of the unit heater.

The Court: Where is that?

The Witness: Right there, sir. (Indicating.) There is a control clamped on to the pipe, temperature control.

The Court: Yes.

The Witness: That will be a little more visible in one of these other photographs.

Mr. Moore: The photograph just referred to by the witness, marked in the lower right hand corner with the numeral 2, is asked to be marked for identification MERCOID EXHIBIT MMM-2.

(The photograph was so marked.)

410 Mr. Moore: Q. I show you another photograph identified by the Figure "No. 3" in the lower right hand corner and ask you if you can identify that?

The Witness: Can you see it, Judge?

The Court: Yes.

The Witness: A. This is a view in fuller detail of the boiler in the shop. One may see at the floor level, at the base of the boiler, an oil burner. About half way up on the boiler and to the right is a bowl-like element, which includes the limit switch for preventing excessive pressures in the boiler.

Over the doorway we see a pipe that comes from the wall and forward in the shop and then back towards the boiler. Upon that pipe, directly above the door, is the fan switch or temperature clamp-on control.

Directly above that and at the very top of the photograph we see the pulley attached to the shaft which operates the fan of the unit heater and a belt drive over to the motor to cause the fan to revolve. This earlier-mentioned clamp-on control in connection with photograph No. 2 may be a bit more clearly seen here at the right of the photograph on the wall to the rear of the boiler. There we may identify the clamp-on control, which is the same type as that which is mounted above the doorway.

411 To the left of the doorway, underneath and back of

the shelving there, upon which are carried cans of paint and enamel, is located a second room thermostat.

Mr. Moore: The photograph just referred to by the witness and identified by the little numeral 3 in the lower right hand corner is asked to be marked for identification MMM-3.

(The photograph was so marked.)

Mr. Moore: Q. I show you one more photograph, with no identification number in the corner, and ask you if you can identify that?

A. Yes. This is a view looking from the shop through the doorway into the front of the store.

As we look through the doorway we can see this center column, upon which is mounted the thermostat for the front of the store. The cover may be seen hanging on the corner of that column, right to its left. Coming back to the doorway we see above the clamp-on control for controlling the fan for the unit heater to the front of the store and above the motor for operating that fan.

At the base of the boiler we see the oil burner, and to the right of that, on the second of the pipes reading from left to right in the front is mounted the combination pressure and low-water control, the circuit instrument in-
412 cluding the pressure-responsive element which operates the switch when high pressures are created in the boiler.

Incidentally, this round device when used only to be responsive to pressure would take the form of the Figure 31 Mercoid control, to which in the first part of my testimony I referred.

To the right of the photograph may be seen a pair of tanks and above that where the black pipe leads back to the wall and then becomes white as it runs along the white wall, we see the second of the two fan controls. That is clamped on the black portion of that pipe.

Mr. Moore: The photograph just referred to by the witness is asked to be marked for identification MERCOID MMM-4.

(The photograph was so marked.)

Mr. Moore: Q. When you were there at the Portner premises did you check up on these various circuits that were shown on that wiring diagram?

A. Yes, sir.

Q. Did you test out or have a demonstration made to you as to how these different instruments operated?

A. Yes, sir.

Q. I show you here an enlarged drawing of the
413 Portner wiring diagram with the circuits in color and ask you if you can step down and point out to the court the various circuits as described in that diagram and which you checked when you were in the Portner installation.

A. We have in this diagram the oil burner, so designated, which provides the source of heat in the boiler, and above that we have the limit control, so designated in this diagram as No. 612.

We have the room thermostat marked No. 21 Spec., with the notation to the right "2 pole thermostat," and we have as designated "on pipe near unit heater set off when pipe is cold" a number designated 35 temperature control, and we have what is designated "steam unit heater motor," the unit heater including a fan for circulating warm air into the room.

Viewing the red circuit, the room thermostat and the limit control 612 are wired in series to the burner motor, so if there are normal pressures in the boiler and the room thermostat should close its switch, we will complete the red circuit to the burner motor and generate combustion.

If the temperature in the steam pipes to the unit heater, that is, from the return side of the unit heater, is cold, then the No. 35 control will be in the open position,
414 so we do not immediately start operation of the unit heater fan.

However, as we generate steam and the temperature of the steam pipes on the return side of the unit heater becomes hot enough, then the No. 35 control will close its switch, thus completing from the room thermostat the blue circuit, which will energize the fan motor and cause the circulation of warm air.

Now, in this arrangement, while we are generating heat in the boiler, if we should approach, I should say, four pound steam pressure, the device numbered 612 will open its circuit, thus cutting off the supply to the red circuit of power to the oil burner, causing it to stop and checking combustion. However, with the room thermostat 21 still calling for heat, we nevertheless can maintain through the room thermostat and through the closed 35 control the blue circuit to the fan motor, so it continues to operate after the burner has been stopped.

When pressures recede in the boiler to, say, one pound

pressure, the 612 control will reclose its switch, thus re-energizing through the room thermostat the red circuit to again establish combustion.

When the temperature to which the No. 21 thermostat is responsive reaches the desired degree, 74 degrees 415 perhaps, it will open its switches, thus opening the circuit to both the fan in the blue circuit and opening the circuit to the burner motor in the red circuit, so in this instance the thermostat stops operaion of the burner, checking combustion, and stops operation of the fan, checking supply of the warm air.

Q. Mr. Black, do I understand this wiring diagram submitted to Mercoid in 1928 allows the fan to operate after the burner has been shut down?

A. Yes, sir.

Q. What is the difference between the blue and red circuits on this Portner drawing and the Figure 2 of the Freeman patent, Mercoid Exhibit VV, if any?

A. There is no difference at all in the circuit arrangement.

Mr. Moore: The enlarged photostat with the colored circuits of the Portner installation are asked to be identified as physical Exhibit, MERCOID JJJ-1.

(The photostat was so marked.)

Mr. Moore: Q. Now, you have not explained, have you, what a unit heater is?

A. No, sir, I have not.

Q. Can you explain to the court, briefly, what it is?

A. A unit heater comprises two elements, one a 416 radiator which is supplied with a heating medium such as hot water or steam, and a fan for blowing air through the radiator, so that that air may be heated and then enter the room to be heated as warm air.

Q. I show you here an enlargement of the photograph No. 3 marked for identification Mercoid Exhibit MMM-3 and ask you if you can identify the illustrations of the instruments here with the indications of the instruments on the Portner diagram?

A. I can identify such elements as have been included in the portion of Exhibit JJJ-1 colored in red and blue. The unit heater, steam unit heater motor, is seen directly above the doorway, and it has a belt drive to the pulley on the shaft of the fan of that unit heater.

The No. 35 control, as seen in the photograph, is upon the

return pipe from the unit heater and is mounted on that pipe directly above the doorway.

Q. Can you see the name of that control in that photograph?

A. Yes, this control bears the name Time-O-Stat. That is an article of manufacture by a company that was a competitor of Federal Gauge Company in 1928.

The room thermostat No. 21 may be seen in back of the shelving. I might say at this time that the one to
417 which I am referring in this photograph No. 3 is the one which controls the heater in the rear of the building. The thermostat which controls the unit heater I previously referred to is, of course, located beyond this doorway in the front part of the store.

The G-2 control—well, I need not refer to that.

The 612 control is seen looking at the front of the boiler in the second row of pipes as this bowl-like structure, while behind it is visible the circular casing housing the switching mechanism and of course the oil burner motor may be seen at the floor level, at the bottom of the boiler.

Q. That control that you referred to here—what did you call that?

A. That is the combination low-water and pressure.

Q. Is that a Mercoid control?

A. Yes, sir.

Q. What number?

A. Figure 71.

Q. We have shown you the Mercoid catalog No. H-3, 1928, which has been marked for identification as Mercoid Exhibit Y. I call your attention to page 18. What is illustrated on that page?

A. Mercoid combination controls. There is shown
418 here the Mercoid Figure 71 at the upper left of these three illustrations appearing on this page.

Q. On page 10 you have the Mercoid Risertherm. Is that an item similar to the Time-O-Stat control that you referred to?

A. Yes.

Q. As a clamp-on?

A. Yes. The Time-O-Stat appearing in photograph No. 3 of the Portner establishment and the Mercoid Risertherm will serve the same purpose, use and function.

Q. Did you conduct a demonstration yourself when you were out there to see how this operated?

A. I did, in part. It so happened on my first visit,

which was in April of 1940, with the temperature prevailing at that time the plant was automatic in its operation. However, I did manipulate the limit control by hand at a time when the burner was operating and the fan was operating and by manipulating the mechanism of the limit control by hand I was able to open the switch. When I did so, the burner stopped, but, as is apparent from the photograph, I was able, when manipulating this control, to ascertain whether or not the unit heater fan continued to operate, and I noticed that it did.

Q. Were you present when these photographs were taken?

419 A. Yes, I was.

Q. And who arranged for the taking of those photographs?

A. I did, sir.

Q. Who else was present when these photographs were taken?

A. You were, Mr. Moore, together with the photographer, Mr. Broderson, and of course Mr. Portner.

Q. Are you familiar with the Williams Oil-O-Matic Oil Burner Company, who manufacture the Williams Oil-O-Matic oil burner?

A. Yes, sir. The Federal Gauge and Mercoid Corporation have made and sold many various types of controls to the Williams Oil-O-Matic people.

Q. Did you ever see any of their publications?

A. Oh, yes, many of them.

Q. Is that how you became familiar with certain of their controls?

A. Yes, and, of course, in Mr. McCabe's department we prepared some diagrams which we submitted to Williams Oil-O-Matic.

Q. I show you here an installation service manual and ask you if that is one of the manuals you had reference to?

A. Yes, sir, it is.

420 Q. I now call your attention to page A-67.

A. Yes.

Q. This page is entitled, "Bricking diagram showing blower type American direct fired unit heater, using Allen-Bradley relay, type 0-1552-Form T, starting switch, with mercury special hot air control for pilot to start blower automatically at 180 degrees and to stop at 120 furnace temperature."

What is the instrument that is illustrated on this page?

A. That is a Mercoid Figure 50 control.

Q. And how is it being used?

A. It is being used for controlling the operation of a fan or blower in response to temperature in the hood of a warm air furnace.

Q. I call your attention to the drawing marked A-150. This is entitled, "Diagram showing the installation of a Mercoid furnace control for warm air furnaces." What is the instrument shown there?

A. Shown here, mounted on the wall and marked furnace control is Figure 50 Mercoid control serving as a limit control to limit the temperature in the furnace. Incidentaliy, this control is also wired in series with the room thermostat.

421 Mr. Moore: This installation service manual and the pages just referred to have been introduced and will be introduced with the depositions taken in Bloomington.

Q. Now, Mr. Black, during the taking of those depositions, there was a colored wiring diagram introduced in evidence and I ask you, with the description you have just given, if that diagram means anything to you?

A. Yes, sir. That diagram shows in a red circuit the use of a Mercoid furnace control about which I have just made mention; the Figure 50. That is in the red circuit, with a Mercoid room thermostat. In the blue circuit I see the Mercoid furnace control, which is the device I previously referred to as Figure 50, connected in the fan motor circuit.

The arrangement of the red and blue circuits provide that even though the red circuit is deenergized, in which instance the burner control panel so designated will stop operation of the burner, the blue circuit may continue to be energized as long as the Mercoid furnace fan control remains closed, so we can stop the burner, but nevertheless continue the operation of the fan motor.

422 Q. You have referred to quite a number of wiring diagrams today in which the various circuits have been set up in red and blue. Can you briefly make a check and show the court just the developments of these various circuits in heating systems embracing an oil burner with a limit control and fan?

A. Yes, sir, I should like to do that.

Q. If you can do so very briefly, and making the cir-

cuits red and blue as in the other diagrams. Is there any particular diagram you care to refer to?

A. We might consider the elements that are involved in these circuits. Referring to the large Mercoid Exhibit VV, Figure 2, of the Freeman patent, we have a room thermostat 18. We also have a limit control 24, and we have a stoker or an oil burner 35.

The Court: What are we doing now?

The Witness: I have been discussing—

The Court: What are we doing now, Mr. Moore?

Mr. Moore: I asked him if he could illustrate here very briefly the development of the heating system whereby you have a room thermostat which controls the operation of an oil burner and a limit control in that and then how you could hook in the circuit to control the operation of a fan.

There are three steps there, and he can show you in
423 a very short time; it will not take you more than five minutes.

The Court: If he wants to draw a picture we will take a recess.

Mr. Moore: And let him make the picture during the recess.

The Court: Yes.

Mr. Moore: Surely.

The Court: But what would please me better—here is a patent. Take that Figure 2 of the patent. Now, there are certain combinations possible there, I take it; there are various combinations of parts of that system patent possible, and I take it that the invention, if any there was, resides in the number of those combinations and in the possibilities of various kinds of combinations. Maybe that is right and maybe it is not right. But that is as far as I have gotten so far. If you have anything that does that, point it out to me. If you can, show me what possible combinations there were, say, in Figure 2 of the patent in suit, how many different combinations, what combinations, and then take what you think is your best reference and say, "Here it is; it has exactly the same number of combinations," or "it does not have exactly the same—it has
424 more or less—but it is our best." If you will do that, you would help me.

The Witness: That is what I intended to do, your Honor.

Mr. Moore: That is what he intended to do, your Honor.

The Court: I do not want to sit while you have him do that. You can have him do it and then show it to me.

Mr. Moore: That is what we intend to do, your Honor.

The Court: We will take a short recess.

(A short recess was here had, after which the proceedings were resumed as follows:)

The Court: Proceed, gentlemen.

Mr. Moore: Q. Now, Mr. Black, you have made a diagrammatical showing here of the heating system with a limit control and a room thermostat in series connection with the motor, and I believe you want to show the various hookups which have been accomplished by Mercoid and by the Freeman patent. Do that just as briefly as you can.

A. In all these various hookups to which I shall refer, the red circuit is the same in each; that is to say, as provided by Freeman, the red circuit includes the room thermostat 18 and the limit control 24. I shall show that that is the same in all of those other arrangements.

The question now is, in what manner do we connect the fan circuit? I have shown here three arrangements that may be had of connecting the fan circuit with the red 425 circuit. For a matter of explanation I have shown one arrangement in a broken line, the second arrangement in full line, which is that embodied in the Figure 2 of the Freeman patent, and a third arrangement in dash and dotted line.

Referring to the first, we have here a connection of the blue circuit to the power supply line in such a manner that only the fan switch controls the operation of the fan. Neither the room thermostat 18 nor the limit control 24 in any way controls the operation of the fan. This arrangement to the left of this drawing, the first, is disclosed in the Peninsula correspondence and other of like correspondence in 1926, and we have pointed out that what was described in the correspondence was shown in the form of a diagram by Mercoid in Exhibit EE-1. There, as I said I would show, the red circuit includes the limit control and room thermostat, 18 and 24 of Freeman. The blue circuit, however, is fed power from the hot line.

The Court: Let me ask you on this drawing you have made here, is Freeman there?

The Witness: Yes, sir, it is the center one. By connecting the fan switch in this first arrangement, although the room thermostat or the limit control opens the red 426 circuit to stop the burner, the fan continues to run as long as the fan switch remains closed, and that is disclosed in the Peninsula correspondence and also in the

Mercoid Exhibit EE-1. It is also disclosed in the exhibit forming a part of the Bloomington depositions, Mercoid Exhibit H-3.

The Court: Let me make inquiry; does the Minneapolis-Honeywell Regulator Company concede that the middle drawing is the equivalent to Figure 2 of Freeman?

Mr. Moore: What does he mean by the middle drawing?

The Witness: In the middle drawing, does the red circuit plus the blue circuit in the center express the hookup of Freeman as shown in Figure 2 of Mercoid Exhibit VV.

Mr. Freeman: That is correct.

The Court: Very well. Go ahead.

The Witness: In the center blue arrangement we find what is the Freeman patent represented in combination with the red circuit, and we also find that that arrangement is found in the Portner installation of 1928, Mercoid Exhibit JJJ.

The Court: Is that the exact arrangement?

The Witness: Yes, sir. That arrangement is also found in Mercoid Exhibit BB-1. Mr. Moore, shall I explain
427 these circuits or just identify the likeness that exists?

Mr. Moore: Would the court care to have him go into the details?

The Court: Oh, no, if he says they are the same, I will assume they are the same until somebody points out difference, or I examine them and I think there are differences, and then I will ask questions; but I won't do that now.

The Witness: In the third arrangement of the blue circuit shown in dash and dotted lines, we find that an arrangement disclosed in the Mercoid drawing No. 266, Mercoid Exhibit YY, 1927.

Mr. Moore: The drawing the witness has just produced showing circuits in red and three blue circuits is offered in evidence as MERCOID EXHIBIT QQ as a physical exhibit.

(The drawing was so marked.)

The Court: What is this one over here at the left? What is that one?

The Witness: This arrangement?

The Court: Yes.

The Witness: As disclosed in the correspondence, also Form P-55, Exhibit EE-1, and the drawing that was called to my attention forming a part of the Bloomington
428 depositions, H-3.

Mr. Moore: Q. Mr. Black, you have read the prior art patents set up in the answer, have you?

A. Yes, sir.

Q. You are thoroughly—

The Court: You might give me a copy of that exhibit you just put in some time.

Mr. Moore: Yes, your Honor. We will have to have copies reproduced for the other side too.

Mercoid will rely upon the patent of Johnson 360,223, the patent of Kilbourn, Cross, Kuntz, Teal—

The Court: What is this? Just a minute, now. J. C. Johnson—

Mr. Moore: Instead of giving all of the patents that are set up in the answer I am stating which ones we rely upon as the prior art teaching the Freeman invention.

The Court: Is this an original exhibit, or is this a copy for me?

Mr. Moore: That is a copy for you, your Honor.

The Court: Now, what patents are you going to rely upon?

Mr. Moore: The patents of Johnson, 360,223, the patent to Kilbourn, Cross Kuntz, Tear, J. C.—

The Court: Wait. Cross, Kuntz—

Mr. Moore: Teal, J. C. Johnson, Sweatt.

429 The Court: What is that, J. C. Johnson, is that 363?

The Witness: Yes.

Mr. Moore: No, that is 1,602,363.

The Court: Go ahead.

Mr. Moore: Sweatf and Edgecombe, and I offer copies of each of these three patents in evidence as MERCOID NNN-1, NNN-2, NNN-3, NNN-4, NNN-5, NNN-6, NNN-7, NNN-8, respectively.

The Court: Did you say three patents?

Mr. Moore: There are eight patents all together, your Honor.

Mr. Freeman: Which Sweatt patent are you relying upon?

Mr. Moore: 1,665,801.

Q. I show you here an enlargement of the patent of E. H. Johnson 360,223, patented March 29, 1887, entitled "Electrical Apparatus for Heating and Cooling Buildings," and I ask you to refer to an enlarged photostat here of the drawing and to explain to the court as briefly as possible what that drawing shows.

A. The title itself, "Electrical Apparatus for Heating

and Cooling Buildings," is really descriptive of what this patent covers, and for accomplishing the heating of the building there is employed a circulating fan, and the time of operation of that fan is controlled by a room ther-
430 mostat.

In the Figure 1 of the patent we find a cross section through a building in which in the basement is located a heating chamber A. Located in the heating chamber and designated by *a* are radiators for heating the air to be delivered to the rooms E and F. The air heating chamber A is supplied with fresh air from the exterior of the building through a pipe B. Referring to this heating chamber the patent states on page 2, column 1, line 2:

"It is shown as provided with radiators *a*, through which a heating medium—such as steam—or a cooling medium—such as water—may be passed; or this chamber A may be the air chamber of a hot air furnace."

Leading from the top of the heating chamber A are ducts C and D through which the warm air may pass into the rooms to be heated. In each of the ducts are located electrically operated motor driven fans H G and in each of the rooms is located a room thermostat I for controlling the operation of their respective room fans. There is provided a source of electric power designated by the numerals 1 and 2 in each of the rooms, and there are connections from that source of power from the room thermostat I and the motor fan H G so that we can control the
431 operation of the fan. When the room temperature lowers and the room thermostat demands heat, power is then supplied the motor driven fan H G and it will draw air, heated air, from the air chamber A through the duct and force it out into the room in which we desire heat. When the temperature rises in the room to the desired degree the room thermostat I then functions to cut off the electric power to the motor driven fan H G and we stop operation of the fan.

This patent shows the use of a room thermostat for controlling the operation of a motor driven fan to take heat from a warm air furnace and give it to the room in which the thermostat is located which calls for heat.

This patent shows air being drawn or sucked out of the heating chamber A, whereas, of course, the illustration in the Freeman patent shows the cool air being forced into the furnace and then through the furnace out through the warm air ducts 11.

However, in that connection I should like to quote from the Freeman patent, page 2, column 1, line 16, in which Freeman states:

"In another form of the invention, the fan 21 may be so placed as to draw the heated air from the furnace instead of forcing cold air thereto."

432 That is the arrangement drawing warm air from the furnace that we find in Johnson.

Q. The next patent referred to is W. H. Kilbourn, patent No. 479,761, dated July 26, 1892. Will you please explain to the court what that patent shows?

A. The title of the Kilbourn patent is, "Temperature Regulator," and this patent relates to thermostatic devices which may be used with heating plants to limit the temperature that you wish to produce by that heating plant.

The patent states on page 1, column 1, line 11:

"My invention relates to an improvement in devices for automatically regulating the temperature, and more particularly to devices for regulating the heat produced by hot water heaters, the object of the invention being to provide means whereby when a tank or radiator containing hot water becomes too hot the draft of the furnace and the damper in the flue leading from said furnace may be automatically and simultaneously operated to close the former and open the latter."

We see in the drawing of Kilbourn a coal fired boiler A and the rate of combustion, that is, where combustion is to be accelerated or checked, is controlled by a draft damper located at the lower right marked K and a check damper in the flue pipe marked J. There is apparatus controlled by magnet coil C which determines the

433 position of the draft damper K and check damper J.

As shown in the drawing, the draft is open and the check closed and the two dampers are connected by a rod G, which is manipulated upon energization or deenergization of the magnet coil C. Connected to the boiler A is a hot water tank B having pipes *a* and *b* connecting with the boiler, and for limiting the temperatures in the radiator B the patentee states, page 1, column 1, line 47:

"Located in the tank B and projecting from the end thereof is a thermostat bar D of any preferred form of construction."

The patentee shows a thermostatic bar D which has its one end immersed in the water tank B and its outer ex-

tremity is free to move as the innermost extremity is heated and cooled by temperature changes in the radiator B. As the temperature rises in the radiator B the thermostatic bar D will move to engage an electric contact *e* and that will set up a circuit including a battery *f* which will energize the magnet C. The armature E will then be pulled downwardly and through an arm F moves the rod G whereby the draft damper K is closed and the check damper J is opened. As temperatures recede in the radiator B, the thermostatic bar D will cool and move away from engagement with contact *e*, whereupon the circuit is
434 broken through the magnet C and the weighted portion of the armature E will then raise the rod G to again open the draft damper K and close the check damper J. Thus we find in Kilbourn the use of a limit device which when a predetermined temperature is reached will function to operate a damper control and check combustion, and as temperature recedes in the radiator to a safe limit, the thermostat will then function to re-energize the damper controller and operate the dampers to cause acceleration of the combustion.

We find there the use also in Freeman of a limit control 24 which responds to a high temperature in the furnace to operate a damper control and a stoker motor and check combustion, and when temperatures in the furnace 10 recede to a safe value, the limit switch 24 will function to restore power to the damper controller or stoker and cause acceleration of combustion.

Q. The next patent I wish to call your attention to is that of W. M. Cross, No. 1,758,146, granted May 13, 1930. There are two figures of the drawing, but I show you enlargements of those sheets and ask you to explain as briefly as you can the construction and operation of this heating system.

A. The Cross patent is entitled "Domestic Heating
435 System," and relates to the heating of a dwelling by warm air, and to control the rate of combustion in the furnace Cross utilizes an automatic electrically operated stoker and also employs a motor driven fan for causing circulation of the heated air to the rooms.

For controlling the operation of the stoker and the fan, Cross contemplates the use of a room thermostat and also a furnace thermostat.

Viewing Figure 1 of Cross, we see a combustion pot 2 in which coal is burned, the coal being supplied to the com-

bustion pot by means of a conveyor screw 49 which conveys coal from a hopper 51 to the combustion pot when the conveyor screw is caused to revolve. To cause operation of the conveyor screw there is an arrangement of suitable gearing to a motor 29. The motor also operates a fan 35 when in operation to cause a draft to aid in combustion. Located directly above and connected to the combustion pot 2 is a series of tubular members joining up with a flue 8 which connects to the chimney 9 and through these tubular openings the hot gases and products of combustion pass out into the chimney. The tubular members are located or pass through the air heating chamber of the furnace and located in the cold air pipe 11 to the air heating chamber is a motor operated fan, the
436 fan 15 being connected by a shaft 16 to the electric motor 17, so that when the motor is in operation air will be forced past and around the tubular members through which the hot gases are passing and there be heated, and thence out into the heating ducts 10 leading to the various rooms.

The thermostat for controlling the stoker and the fan is shown in Figure I at the upper left of the drawing, and the furnace thermostat is shown as being above the fire in the fire pot, and I may briefly state that the function of that instrument here is to operate the stoker during long periods of time when there is no call for an operation by the room thermostat, that is to say, that if the room thermostat at an early hour in the morning should become satisfied and then not call for heat until late in the evening, the fire during that interval might go out. So Cross employed here a combustion or furnace thermostat that would respond to changes in temperature in the furnace so it would take over operation of the stoker during that long interval to prevent the fire from going out.

The electrical connections of the thermostatic apparatus and the fan and stoker is best shown in Figure 2. The room thermostat is identified by the numeral 22 and
437 the furnace thermostat by the numerals 38, 39, 40 and 41.

The stoker motor bears the designation 29 and the fan motor 17.

When the temperature drops in the room, the room thermostat will function to cause a closure across contacts 24 and 25, whereupon a supply of power will be had from the power supply line 31 over the wire 30 over contacts

25 and 24 and then by wire 26 to wire 26*a* to the stoker motor 29 and over wire 28 to wire 32, the return site of the power supply. At the same time, from contact 24 circuit is also completed over wire 26 to the fan motor 17 and thence over wire 28*a* to wire 28 we can go to the power line 32. Thus when the room thermostat functions on a drop in room temperature the stoker motor 29 is operated and the fan motor 17 is operated, whereby we get acceleration of combustion and a forced supply of heated air to the rooms. When the room temperature reaches the desired degree, room thermostat 22 again functions, and at this time breaks the electrical connection across 24 and 25, thus de-energizing the circuit to the stoker motor 29 and de-energizing the circuit to the fan motor 17 so that we check combustion and we check the supply of the heating medium.

The function of the furnace thermostat to which I
438 referred would produce the same results as was done by the room thermostat when it closed its circuit on a drop in temperature in the furnace and opened its circuit upon a rise in temperature in the furnace.

We find in Cross then the use of a room thermostat which controls both acceleration of combustion through a stoker motor 29 as well as the operation of the circulating fan identified here as 17, and we find in Freeman that arrangement where the room thermostat 18 functions to control both the fan motor 22 and the stoker motor 35.

Q. The next patent is the patent to Kuntz, 1,193,271, granted August 1, 1916, heating and ventilating systems. I show you an enlargement.

The Court: What is that 38 in Figure 3 of this patent of Cross?

The Witness: It is a temperature control which responds to temperature.

The Court: In the boiler?

The Witness: No, as shown here, air temperature in the combustion space.

The Court: Oh, yes.

The Witness: Mounted directly above the fire. It is not marked by reference numeral in Figure 1, but it is identified by its construction form upon looking at Fig. 2.

439 The Court: Now, tell me this. Both switches are open there in Figure 3, are they not?

The Witness: Figure 2. This is Figure 3.

The Court: Yes, sir, Figure 2. Both switches are open there, aren't they?

The Witness: Yes, sir.

The Court: Suppose the room gets cold? What happens?

The Witness: The room thermostat 22 will cause a closure across contacts 24 and 25.

The Court: What will happen?

The Witness: It will energize the fan 17 and the stoker motor 29.

The Court: Then suppose the room gets hot?

The Witness: The thermostat 22 will cause an opening of the circuit across 24 and 25. We will then stop operation of the fan 17 and stop operation of the stoker motor 29.

The Court: Suppose the fire goes down? What happens?

The Witness: If it goes down to the setting of 38 it will close contacts 40 to 41 and we will then establish a circuit.

The Court: And what will happen?

The Witness: We will energize the fan motor 17 and the stoker motor 29.

440 The Court: Then, suppose that fire goes up? What did I assume? The room was warm?

The Witness: You had assumed the room was cold.

The Court: No, I assumed the room was warm, but the fire went down.

What is that device 21 and 20?

The Witness: That is a humidifying apparatus.

The Court: That is all it is?

The Witness: Yes, sir.

The Court: Is that hitched onto anything?

The Witness: That is a float arrangement to maintain a level of water, to maintain moisture.

The Court: That is all that is?

The Witness: Yes, sir.

The Court: All right, go ahead.

Mr. Moore: Q. I show you an enlarged photostat of drawing from the patent and ask you to explain that to the court as simply as you can.

A. The patent of Kuntz is entitled, "Heating and Ventilating System," and the patentee states page 1, column 1, line 9:

"My invention relates to heating and ventilating systems and aims to provide improved means whereby the draft is regulated, and at the same time the supply of air to

the air heating chamber of the heater is controlled."

441 This patent is similar to Cross, in that it has a means for controlling combustion which in Kuntz is the damper E, whereas in Cross it was the automatic stoker. In the Kuntz patent the motor-operated fan is like the Cross and used for the purpose of forcing warm air into the rooms being heated.

As shown in Figure 4 we have a warm air furnace A with an air heating chamber a'. Leading to the right of the furnace is a duct a^2 having registers a^3 out of which the warm air may emerge into the rooms being heated.

To the left of the furnace A is the cold air supply in which is inserted the motor-driven fan B, C. In the flue out of the combustion space a^4 is located the damper E, and as shown in the drawing it is positioned so that a draft is created in the combustion space of the furnace, and associated with this damper E is a plate which opens or closes holes in the flue pipe A which are designated as e^2.

When the damper is as shown in Figure 4 the holes e^2 are closed, and when it is desired to check the fire the damper E is moved crosswise of the flue a, and the holes e^2 open so that we check combustion.

442 To operate the fan and the damper we find here an apparatus comprising a solenoid having a coil H and a core I. Secured to this core is a bar J which when the solenoid H is deenergized will move to close the switch L, K, and at the same time there is a connection to the bar J, through an arrangement of levers e^6 and e^4, whereby the damper E when the switch L, K, is closed will be moved to the position as shown in Figure 4, where we permit a draft to occur in the combustion space of the furnace.

Controlling the solenoid H is a room thermostat G, and when the temperature is below the desired degree wished in the room, the room thermostat G will be in open circuit position. So that the coil H is deenergized and we then find as shown in Figure 4 a closure of contacts L and K, so that the source of our power is supplied over the wire marked plus, through contacts L and K, and then down to the fan motor C, back to the line marked minus.

So we operate the fan to circulate the heated air to the rooms and with the fan operating the damper is also positioned so as to create a draft in the furnace. When the room temperature rises to the desired degree, the thermostat G will close its circuit, whereupon we will energize over wire F through the room thermostat G the solenoid H

and raise that bar J so as to break the circuit across
443 L and K which will stop operation of the fan and at the same time will operate through these levers e^6 and e^4 the damper E so that it is positioned to check combustion, and we therefore find in Kuntz an arrangement of a room thermostat which controls both a fan and an apparatus for controlling the rate of combustion, the same as we find the room thermostat in Freeman as shown in Figure 2, Mercoid Exhibit VV, controlling both operation of the stoker motor for generating combustion and the fan 22, so when the temperature rises to the desired degree the room thermostat operates to stop both of them.

Q. The next patent is Teal, No. 1,067,627 granted July 15, 1913, and entitled "Automatic Temperature Regulator." I show you enlarged photostats of drawings of this patent and ask you to explain the construction and the operation as briefly as possible to the court.

A. The Teal patent relates to heating plants in which coal is burned that employ controlled dampers for accelerating or checking the rate of combustion, and refers further to the control of the damper controlled by means of two thermostats. One responds to room temperature changes and the other responds to temperature changes in the furnace.

As shown in Figure 1 we have a warm air furnace,
444 one with a draft damper 4 and check damper 3, and a damper controller designated by the numeral 5, which when supplied with electric power can manipulate and position the draft and check dampers 3 and 4. The dampers are connected to the draft controller so that as shown in the drawing when the draft 4 is closed the check will be open, and when the draft controller is operated to open the draft 4 we will close the check 3.

Controlling the operation of the draft controller 5 is a room thermostat designated as 10. When the temperature falls in the room below that which is desired the thermostat 10 functions to energize the damper controller 5, whereupon we open damper 4 and close the check 3, thus causing acceleration of combustion in the furnace 1. Teal, as he points out in his patent, appreciated that during the times when the room thermostat may be causing acceleration of combustion he might produce in the furnace an overheated condition, a dangerous or hazardous condition, by raising the temperature too high in the furnace, so he contemplated and chose the use of a thermostat 25 located

in the air heating space of the furnace, and arranged so that when the temperature becomes too hot in the furnace, the furnace thermostat 25 will then function and act independently of the room thermostat 10 to operate the
445 damper controller 5, whereby when the temperature has approached that dangerous degree the furnace thermostat 25 acting as a limit control will cause a closure of the draft 4 and an opening of the check 3 to check the combustion. The limit control, that is, the thermostat 25 in the furnace, will function when the temperature recedes in the furnace to normal safe values to again cause or permit the closure of the circuit from the room thermostat to energize the damper controller 5, whereby the draft 4 will be opened and the check 3 and we will then start again to accelerate combustion.

The arrangement of the electrical circuit in this Teal patent is shown in detail in Figure 2. It is rather complicated wiring. I think I might just say, without going over that involved wiring, that the thermostat 10 and the switch arrangement of the thermostat 25 provides a series circuit connection to the damper controller 5, when temperatures in the furnace are low, that is to say, when the room thermostat 10 calls for heat, the circuit must pass through the limit conrol 25 in order to energize the damper controller 5. So that to cause an acceleration of combustion by opening the draft, we must have the room thermostat 10 and the furnace limit thermostat 25 in a closed circuit position. However, either the room thermostat by
446 itself may energize the damper controller 5 to check combustion and the furnace thermostat may by itself independently of the room thermostat function to check combustion. That is the arrangement that we find in Figure 2 of the Freeman patent, Mercoid Exhibit VV. There is, as shown in red, a series circuit through the room thermostat 18 and the limit control 24 which goes to the stoker motor 35. In this circuit to energize the stoker motor 35, the room thermostat 18 and the limit control 24 must be in a closed circuit position before energization of the motor can take place, and in Freeman as in Teal the room thermostat may act independently from the limit control 24 to interrupt the red circuit and stop the stoker motor and combustion. Likewise the limit control in Freeman as in Teal operates independently of the room thermostat under high temperature condition to interrupt the red circuit and stop combustion. The two controls, the room thermostat

and limit control, are independent in order to create combustion, but they are independent in their action to stop combustion.

Q. Figure 1 of the Freeman patent shows the application of the Freeman system to a hand fed coal fired furnace, does it not, the same general type as that dis-
447 closed in Teal?

A. Yes. Where Teal controls combustion through damper controller 5, Freeman shows dampers and damper controller 19 for controlling their position.

Q. The next patent is the patent to J. C. Johnson No. 1,602,363, granted October 5, 1926, for an Electrical Control Mechanism For Fuel Oil Burners and I show you a photostat of Figures 1 and 2, enlargements of the Patent Office drawings, and ask you to explain that construction and operation to the court.

A. This patent to Johnson, No. 1,602,363, provides for control apparatus to regulate the operation of an oil burner. As the controlling apparatus the Johnson patent employs that which we have seen previously to be quite common, a room thermostat 24 and a boiler limit control 26. The burner motor is designated by the numeral 19 and it fires into the boiler for creating heat within the boiler.

A relay, designated as 18, referring to Figure 2, is utilized to control the supply of electric power to the oil burner motor 19. When the magnet coil 18 is energized it operates through an arm 16, 17, a switch 15 which closes the supply over wires 11 and 12 to the burner motor 19 by wires 13 and 14.

448 There is a control circuit for energizing the magnet 18, which begins over wire 23 from the power line 11, and after passing through the control apparatus flows through the magnet 18 and thence over wire 40 to the wire 12, the other side of the power supply.

Interposed in this control circuit is the room thermostat 24 and 26, and they are arranged to provide the same form of control that I described in connection with Teal, only in the Johnson patent we show an oil burner for creating combustion rather than a coal-fired furnace of Teal controlled by dampers, and I think my treatment of Johnson may be limited to the function and purpose of the room thermostat 24 and 26 for controlling the relay 18 which supplies power to the burner 19.

As is very apparent in Figure 2, there is a series connection of 24 and 26. That is, to energize the magnet 18,

current flowing over wire 23 must pass through 24 and 26 to cause energization of 18, so that room thermostat 24 and limit control 26 are interdependent in order to complete energization of the magnet 18, but as in Teal the room thermostat 24 may independently of the limit control 26 deenergize the magnet 18 and cut off power suppiy to the burner 19.

Likewise, the limit control 26, if it responds to a
449 high pressure condition or temperature condition in the furnace, it can function when that temperature is reached to interrupt the supply of power to the magnet 18 and thus cause a stopping of the oil burner 19 and check combustion.

We find in Johnson patent No. 1,602,363, the use of a room thermostat and a limit control as it is used in the Freeman patent, Figure 1 or Figure 2, where the circuit to be completed to the stoker motor, as exemplified in Figure 2, Mercoid Exhibit VV, and shown in red, must be completed through the room thermostat, and the limit control 24 and the room thermostat 18 may independently of the limit switch check combustion, and likewise the limit furnace control 24 may act independently of the room thermostat 18 to check combustion.

450 Q. Had you completed your remarks in connection with the Johnson patent last night when we returned?

A. Yes, sir.

Q. The next patent is the patent of Harold W. Sweatt, granted April 10, 1928, No. 1,665,801, entitled "Unit Heater Control." I show you an enlarged photostat of draw-
451 ing in this case and ask you to please explain to the court, as briefly as you can, the various instruments shown here and how they operate.

A. The Sweatt patent, No. 1,665,801, relates to heating a space by warm air and involves the thermostatic control of a supply of heat to the space as well as the circulation of warm air in that space.

The patent is entitled "Unit Heater Control" and the unit heater comprises a radiator, shown to the left of the drawing, with which is associated an electric motor driven fan 1 for blowing air through the radiator, to be heated by the radiator, and then into the room for heating the room.

In the heat supply pipe to the radiator is located a magnetic valve 2. The magnetic valve has an electric coil 4 which when energized will raise the valve stem and open the supply line to admit steam or hot water to the radiator,

and when the coil 4 is de-energized the valve stem will lower to seat of valve and close off the supply of heat to the radiator.

The coil of the magnetic valve is in a circuit which includes switch contacts 5 and 6 of a relay marked in the drawing relay No. 1.

Controlling the operation of the relay No. 1 is a
452 room thermostat marked in the drawing as "Room."

In response to temperature changes in the room the relay is energized or de-energized, as the case may be, to cause the valve 2 to open and close.

The circulating fan 1 adjacent to the radiator is included in an electric circuit which includes the switch contacts 8 and 9 of a second relay marked in the drawing relay No. 2.

Relay No. 2 is controlled by a second thermostat specified in the drawing "at radiator." This thermostat is located adjacent to or upon the radiator, so that the fan will not run until the radiator is hot.

When the radiator is hot the thermostat at the radiator will function to energize relay No. 2, closing the switch contacts 8 and 9, thus operating the fan 1.

There are electrical connections between the room thermostat "room" and the fan thermostat "at radiator," so that the electric circuit controlled by the radiator thermostat cannot be completed unless the room thermostat is also closed.

Thus in this arrangement we have thermostatic control of a heat supply through the valve 2 and thermostatic control of a motor fan 1 that produces this sort of operation:

453 When the room temperature lowers, the room thermostat will function to energize relay No. 1, thus closing switch contacts 5 and 6, energizing the valve coil 4 to open the valve and permit steam to enter the radiator.

With the radiator cold at this time, the fan thermostat "at radiator" is in open circuit position, so we do not immediately start the fan 1. However, as the radiator heats up, the thermostat at the radiator will close its circuits and energize relay No. 2, whereupon the fan will operate, forcing air through the radiator, where it will be heated and out into the room.

As the room temperature rises to the desired degree for which the room thermostat is set, it then functions to open its circuits, and it does two things in that operation; it de-energizes relay No. 1, which opens contacts 5 and 6, thereby

de-energizing the valve 2 and closing off the supply of heat to the radiator, and it also, through its connection with the fan thermostat, de-energizes the relay No. 2, so at the same time operation of the fan motor 1 ceases.

We find in the Sweatt patent the use of the room thermostat which controls the supply of heat and also controls the operation of a circulating fan, and we find a second
454 thermostat connected in the room thermostat circuit which will delay the operation of the fan motor until the radiator is hot.

That is the arrangement we find in Figure 2 of Freeman patent as shown in Mercoid Exhibit VV, wherein a room thermostat 18 controls the operation of a motor driven fan 22, and in that circuit which is shown in blue there is a second thermostat 23, which delays the operation of the circulating fan until there is a proper temperature created, at which time it would be desirable to circulate the heated air, and there is this similarity in that the room thermostat 18 of Freeman also controls a form of heat supply generated by the stoker motor 35, and when the room thermostat 18 becomes satisfied it stops both the generation of heat in the medium which heats the air as well as the energization of the fan which circulates the heated air.

This unit heater structure shown in the Sweatt patent is the kind that Mr. Portner used in his system. He also employed a unit heater which included a circulating fan for circulating the air heated by the radiator.

We also find in the Cross patent a former radiator through which the line 33 extends, which is in the air heater space with the fan closely adjacent to it, and it is the
455 forcing of air through the radiator section of this furnace that causes the air to be heated and emerge thereafter through the ducts to the various rooms.

I might also call attention to Johnson patent, which also showed a means of heating the air to be circulated in the room as employing radiators as shown in Figure 1*a*, and, as I previously mentioned, that Johnson patent No. 1,602,363 stated that with reference to this air heating chamber A it is shown as provided with radiator *a* through which a heating medium such as steam or water—may I correct that?

It is shown as provided with radiator *a* through which a heating medium such as steam or a cooling medium such as water may be passed, or this chamber A may be the air chamber of the hot air furnace.

Q. I next wish to call the witness' attention to the Edgecombe reissue patent No. 15,531 of January 23, 1923, entitled "Circulating Control System," and I show you an enlarged photostat of the drawing and ask you if you will explain this patent to the court.

A. This patent relates to a warm air heating system which employes damper control dampers for generating combustion in a furnace, as well as the use of a motor driven fan for circulating air through the furnace, 456 where it is heated and then passes into the rooms of the dwelling.

This damper apparatus and the fan apparatus is controlled in Edgecombe by three thermostats.

Referring to the drawing, we have a furnace 10, having a draft damper 15 and a check damper 16, these two dampers being controlled by a damper controller 19.

As shown in the drawing, the draft damper 15 is open and the check 16 closed, whereby there could occur an acceleration of combustion in the furnace.

The damper controller, which positions the two dampers, is electrically operated through a thermostat 25, which is located in the room of the dwelling. So that as the temperature declines in the room the thermostat 25 can move to the left and so energize the damper controller 19 that it will place, as shown in the drawing, the draft damper 15 and the check damper 16 in the positions as shown.

As the temperature rises in the room, the thermostat 25 will move to its other contact and so energize the damper control 19 that the draft damper 15 will then be closed and the check 16 open.

The fan operated motor is represented by the numerals 34 and 37 and it is in an electric circuit which includes 457 the switch contact member 38 and a relay having operating coils 39 and 40.

Controlling the operation of the circulating fan is a second room thermostat designated as 44, and that is connected up by circuits to a second fan thermostat located in the air heating chamber of the furnace bearing the reference numeral 47.

The arrangement of the thermostat 44 and the thermostat 47 in the furnace by their electrical connections is one in which when the thermostat 44, upon a drop in room temperature, calls for operation of the circulating fan 37-34, the fan will operate only if the furnace has reached a desired degree wherein it will operate the thermostat in the

furnace 47, thus the thermostat 47 functions to prevent a full completion of the circuit to the fan motor when called for by the thermostat 44, until the furnace has been properly heated.

The patent states that the thermostat 25 is set to operate at slightly lower temperatures than those to which the thermostat 44 responds. So we might specify a few figures here and state that when the temperature drops to 72 degrees the thermostat 44 will engage switch contract 46, which is intended to complete the circuit to the relay, 458 whereby 38 will engage with its switch contacts to establish a power supply to the electric motor.

However, if the furnace temperature is low, this circuit will not be completed, because of the circuit position of the furnace thermostat 47. Therefore the temperature in the room will decline further, and we will say at 72 degrees thermostat 25 will then respond to establish a circuit to the damper controller and thus place the damper and check in the position shown in the drawing, whereby we will accelerate combustion.

Upon acceleration of combustion, we raise the temperature of the air heating space, and thermostat 47 then responds to close its switch and then completes the circuit originally intended to be established at 44 46, and the coil 39 then is energized to cause the switch member 38 to complete the power supply to the fan motor 37, and we get fan operation and a forced circulation of air through the furnace, where it is heated and out into the ducts 32 to the rooms.

As the room temperature rises now, since we have been forcing warm air into it, the room thermostat 25 is first to respond to this rise in temperature and it does so to complete an electric circuit to the damper controller, whereby the damper 15 is closed and the check opened, and we check combustion.

459 However, we have not yet satisfied the demands made by the room thermostat 44, which is set at a somewhat higher degree than 25, so that the fan continues then to run, although we have checked combustion, in order to meet the demand made by the room thermostat 44.

When that proper temperature is reached, thermostat 44 will then engage contact 45 and a circuit will be completed to energize coil 40, whereby the switch member 38 is moved away from the power contacts and we interrupt the supply of power to the fan motor 37, thus stopping its operation.

We have in Edgecombe here the use of three thermostats, one of which 25 controls the rate of combustion in the furnace and we have a combination of two other thermostats, one responsive to room temperatures and one responsive to furnace temperatures, whereby those two are interdependent in order to establish power to the fan motor 37.

460 The arrangement as explained in the patent is one which permits the combustion controlling thermostat to check combustion in advance of the termination of the operation of the circulating fan by the thermostat 44, so that in this operation we check combustion but permit the fan to continue to operate.

I might say that the switch arrangement of the fan thermostat 47 provides that in the event we check combustion through operation of thermostat 25 and the temperature should decline in the furnace before we have satisfied the thermostat 44 demands, that the furnace thermostat 47 may independently, if the temperature gets too low, function to energize the coil 40 and interrupt the power supply to the fan 37.

Thus there is a similarity between Edgecombe and the Freeman patent, exemplified in color in Mercoid Exhibit VV, of a series of circuits or independent relationship of a room thermostat and a furnace thermostat, such as in Freeman 18 and 23 in the blue circuit, that they both must be in a closed circuit position, indicating demand for heat in the room and indicating a proper warm temperature in the furnace in order to operate the motor fan 21-22.

And we have this condition in Edgecombe that I 461 referred to before and also in Freeman, that where Freeman interrupts the red circuit to terminate combustion or have acceleration of combustion by the thermostat 24 located in the furnace, Freeman still permits the blue circuit to continue in operation while high temperatures exist in the furnace and the room thermostat still wants heat, as defined in Edgecombe, wherein the thermostat 25 may check combustion, whereafter there still may continue through the thermostat 44 and the thermostat in the furnace 47 operation of the circulating fan.

Now, all this prior art to which I have been making reference shows that the thermostatic control of fans and heat generating apparatus teaches the circuit arrangement of that apparatus—

Mr. Freeman: Is this going to be an argument now or testimony?

The Witness: I just want to point out a few of these things to sum up my comparisons.

A. (Continuing.)—that is utilized in the Freeman system.

We find that room thermostats for controlling fans as exemplified in the Johnson patent and the Teal patent, Sweatt patent and Edgecombe patent, are taught, as well as the inclusion in the room thermostat circuit as shown
462 by Edgecombe a furnace thermostat which may delay operation of the fan until the furnace is warm, and including in the room thermostat circuit a fan switch, shown in Sweatt, which delays operation of the fan until the radiator is hot.

We also find that the prior art shows room thermostats for controlling the rate of combustion as exemplified in Teal, and as exemplified in the thermostat 25 in Edgecombe. And, further, to include in the thermostat circuit which controls the rate of combustion a limit control which may operate independently of the room thermostat to check combustion when high temperatures occur in the furnace. We find that in Teal and we find that in Johnson patent No. 1,602,363. These two patents show the combination of a room thermostat and a limit control in the furnace and a room thermostat in Johnson 24 and a limit control 26 in the furnace or boiler.

We also find in the Sweatt patent operations the room thermostat, being one which when satisfied terminates operation of both the supply of heat and the operation of a circulating fan, as well as the same function of the room thermostat in Cross, which when it becomes satisfied terminates the acceleration of combustion as caused by the stoker as well as termination of the operation of the circulating fan.

463 Mr. Moore: Direct examination closed.

Cross-Examination by Mr. Freeman.

Q. Mr. Black, will you point out the best patent prior art that you have here referred to? You have referred to eight patents. Pick out the best one.

A. For what purpose, Mr. Freeman?

Q. So that we might understand which one of these patents you consider the best as anticipating or meeting the complete concept of the Freeman.

Mr. Moore: These patents were set up in the prior art as teaching the invention and not as anticipation.

Mr. Freeman: Then do you concede, Mr. Moore, that not a single patent that you have here produced anticipates the Freeman patent?

Mr. Moore: I am not so contending.

Mr. Freeman: Then I would like to have the witness tell me which one of those patents he considers the best reference, then, for any purpose.

The Witness: A. I would select the Edgecombe patent reissue 15,531 as the best reference.

Mr. Freeman: Q. Now, taking the Edgecombe patent, do you find in the Edgecombe patent a limit switch which upon rise of temperature in the furnace itself inter-
464 rupts the operation of the burner motor. And that is a question you can answer with a yes or no.

Mr. Moore: He did not testify that the Edgecombe patent had a burner motor.

Mr. Freeman: That checks the rate of combustion.

Q. You knew what I meant.

A. There is not in Edgecombe a thermostat in the furnace which checks the rate of combustion.

Q. So that if the room thermostat were demanding heat and were in a closed circuit position, and a window in the room were open so that the furnace could not satisfy the room, that is, the temperature within the room, to move the thermostat to its open circuit position, the furnace will keep on burning indefinitely or so long as there was the application of fuel to the combustion pot, is that correct?

A. Yes. However, in Edgecombe under that condition—

Q. You have answered my question.

A. (Continuing.)—the circulating fan—

Q. I say, you have answered my question.

A. (Continuing.)—would continue to operate to move the hot temperature created in the furnace.

Q. I asked you this question and I wish you would please answer. Is there any limit switch that will stop
465 combustion? When I want to ask you about the operation of the fan I will direct a specific question to you on that point. Now, will you answer my question, please?

A. I specified when you first asked the question that there was in Edgecombe no thermostat in the furnace which will respond to furnace temperature to check combustion.

Q. And the furnace would keep on operating indefi-

nitely, irrespective of the temperature within the furnace proper, so long as the thermostat was not satisfied, that is correct, is it not?

A. That is in Edgecombe, yes.

Q. That is what we are talking about. Now, that is the best reference you had, Edgecombe?

A. I would like to say why I think it is the best reference, and that is—

Q. Go right ahead. I would like to find out myself.

A. That is, that I have heard expressed that the novelty of the Freeman invention rests in checking combustion and permitting the fan to run afterwards. Now we have in Edgecombe a thermostat, that is 25, which—

Q. That is a room thermostat?

A. Yes, sir.

Q. All right.

A. That is where it is shown in the room.

466 Q. All right.

A. That will check the rate of combustion before the room thermostat 44 is satisfied, whereby there is a circulation of the warm air continuing after we check combustion.

Excuse me just a moment until I get some more of my notes here.

It seems to me that in view of Teal and Kilbourn that—

Q. Now, I asked you about a single reference. I understood you on direct examination after you referred to each one of the eight prior patents to tell this court that each patent was the same as Figure 2 of Freeman.

A. I pointed out a portion of Figure 2 of Freeman.

Q. But you never said at one time that you were only picking out pieces of the prior art and then applying such prior art to portions of the Freeman patent.

A. I made reference only to the devices which the prior art showed which were found in Freeman, and named the red or blue circuits which included them.

Q. Then you will agree with me that you do not find in the Edgecombe patent anything that serves the function of the limit control 24 in the Freeman patent? And that can be answered yes or no.

467 A. No, there is no furnace limit switch in Edgecombe.

Q. So that there is no control in Edgecombe that permits the checking of combustion upon rise of furnace temperatures that will interrupt combustion or check combus-

tion and still allow the heating medium within the furnace to be disbursed or passed on into the rooms to be heated?

A. As I said before, there is no furnace thermostat serving as a limit control in Edgecombe. I would like to read—

Q. And you understood counsel when he made the statement as to what he considered the novelty of the Freeman patent, did you not?

A. Yes.

Q. You have repeated that several times upon your direct examination. And that feature by which we obtain a sequence of operation, that thing that counsel referred to as the novelty of Freeman, is not found in Edgecombe?

A. If it is to include the furnace limit switch, it is not.

Q. There is not anything in Edgecombe that checks the rate of combustion upon rise in furnace temperature, a limit switch that turns off the motor and still permits the heating medium to be forced away from the furnace 468 by a fan?

A. There is no furnace limit switch in Edgecombe. However, I should like to read from the Edgecombe patent, page 2, column 2. What I read here will bear upon my direct testimony as to what I said occurs when the room thermostat 25 checks combustion, that the operation of the circulating fan follows thereafter.

Q. I will agree with you that when the room thermostat in Edgecombe moves to open circuit position that the burner is interrupted. That is true also with the room thermostat 18 of Freeman, is it not?

A. That is right.

Q. But we were both talking, or at least I was asking you with respect to the control of the burner by a device thermostatically operated within the bonnet of the furnace which would control the operation of the burner or the fuel of combustion within the combustion pot in the event that the furnace reached an unsafe or dangerously high temperature.

A. No, the difference is in the location of the thermostat 25. It is in the room, whereas the thermostat 24 in Freeman is in the furnace. There is that difference of location.

468 Q. That is, you are now telling us that the ther-
469 mostat that controls Edgecombe is located in the room.

A. It so appears in the drawing.

Q. And that is what the specification says?

A. Yes.

Q. And you are now telling me that in Edgecombe it is the location of the thermostat 25 in the room, whereas in Freeman it is the location of the thermostatic control 24 in the bonnet of the furnace that is the difference?

A. A matter of location of the one thermostat, yes.

Q. Now, if that be true, as you have said, where do you find in Edgecombe the thermostat 18 or its equivalent; and by thermostat 18 I am referring to the Freeman patent?

A. That would be the thermostat 44.

Q. And that likewise is located in the room?

A. Yes, sir.

Q. Now, are you telling me that thermostat 25 of Edgecombe is the same as thermostat or limit control 24 of Freeman?

A. May I have that question, please?

(Mr. Freeman's last question was read as above recorded.)

A. They are both thermostats responsive to temperature. The function of both is to check combustion when each reaches its particular setting, and the only difference is where you put it, whether it is put in the room as shown in Edgecombe, or put in the furnace as shown in Freeman.

Q. Freeman shows two thermostats, one in the room and one in the furnace bonnet, which when they move to open circuit position, either of them, interrupts the operation of the burner motor, is that correct?

A. That is correct. That is the red circuit.

Q. Now, what interrupts the operation of the damper motor in Edgecombe?

A. The damper motor—

Q. Is there one or two thermostats for that purpose?

A. One thermostat, 25.

Q. Mounted in the room?

A. Yes, sir.

Q. Now, in the installations wherein you use the M-80, do you likewise use a room thermostat in such installations?

A. Yes.

Q. So that in effect Freeman has three thermostatically controlled instrumentalities; one a room thermostat, do you agree with me?

A. Yes, sir.

Q. And second, a limit switch, thermostatically con-

trolled, mounted in the furnace bonnet. Do you agree with me?

A. Yes, sir.

471 Q. And likewise a third thermostatically controlled instrumentality sometimes known as a fan switch, mounted in the furnace bonnet, is that correct?

A. Yes, sir.

472 Q. So we have in Freeman three instrumentalities, is that correct?

A. That is right.

Q. And in the wiring diagrams wherein you recommend the use of the M-80 you likewise have three instrumentalities, do you not? That is, to be exact, a room thermostat, a limit switch, and a fan control?

A. Yes, in the same way that that was found in the early arrangements of diagrams published by Mercoid, we also have found, by way of example, Exhibit YY, those same three separate devices.

The Court: Mr. Black, I hope you will not take offense. You have been an excellent witness up until the cross-examination, and you have the capacity to be an excellent witness throughout if you will forget the idea that you have to try this case. There is excellent counsel over here thoroughly capable of trying the case. You answer the question. If something else ought to be said in connection with that, counsel will bring that out. All you have to do, if you want to really be an excellent witness, just be sure your answer is responsive, whether it is on direct or cross, and let counsel try the case. It is his responsibility. He has the ability to do that. You have the capacity of being a very excellent expert witness if you

473 do not fall into the mistake, which so many expert witnesses have, of trying to try the case. I say that kindly, whether you were an older man or a relatively young man.

The Witness: I appreciate it. Thank you.

Mr. Freeman: Q. Coming back to Edgecombe, if the thermostat 25 of Edgecombe demanded heat, and a window or two in the room were open, the furnace would keep right on going because the room thermostat would never be satisfied, is that correct?

A. Yes.

Q. And there is not any instrumentality in the Edgecombe patent upon such a condition that would of itself step in as a safety device and terminate combustion?

A. There is no furnace limit switch functioning under the conditions you cited that will stop combustion.

Q. And in Freeman, taking the same condition, where a room demanding heat and a window or two were open, and it was 20 below zero outdoors, the thermostat 18 would not be satisfied. There is, however, an instrumentality by which the furnace would stop producing combustion, is there not?

A. Yes, sir.

474 Q. And that instrumentality is exemplified or referred to by the reference numeral 24?

A. Yes.

Q. And in the M-80 there is such an instrumentality arranged to be located in the bonnet of a furnace??

A. Yes.

Q. Turn now to Sweatt patent No. 1,665,801; do you find anything comparable to the protective device or limit switch 24 of the Freeman patent there disclosed?

A. No, sir.

Q. And in that respect Sweatt differs from Freeman very much as Edgecombe differs from Freeman, and I am asking that because I think we might save some time in not having to go through all of the details if you agree with me.

A. That there is no showing of a thermostat located in the furnace acting as a limit control?

Q. There is not any so-called protective device or safety device which would function to prevent the burner from burning up or from eliminating the dangerous or hazardous condition that some times might arise and does arise in furnaces and heating plants.

A. No, there is not.

Q. So that Sweatt differs in the same respect as
475 Edgecombe from the Freeman patent?

A. As regards a furnace limit switch, yes, sir.

Q. The M-80, made by Mercoid Corporation, is primarily arranged for use with a hot air furnace, is that correct?

A. That is correct.

Q. And it, as made by your company, could not be used with a heating plant of the steam type, could it?

A. Only, Mr. Freeman, in the sense—I am sorry, but I must refer to one of the prior art patents.

Q. Go right ahead.

A. Only in the sense that Johnson, for example, shows

a heating chamber in which radiators are located to heat the air in the chamber. I would say that in that showing we may employ steam to heat the radiators and the M-80 could be responsive to the heating of the air in there by the steam radiation.

Q. In the Johnson system, taking your example, the member *a* corresponds, as you say, to a furnace Figure 10?

A. Yes.

Q. And the combustion or the creation of heat is produced within the compartment *a* by means of steam coils or the like, is that correct?

A. That is one form he says may be used, yes, sir.

Q. Well, the other form he merely says you can put 476 in refrigerant and serve it as cooling, does he not?

A. No, he says that A might otherwise be the air chamber of a hot air furnace.

Q. All right.

A. That would bring it probably right into the very sphere that we find represented.

Q. That is what I said.

A. Yes.

Q. We will go along on the basis that compartment A of Johnson is no difference than the furnace 10 of Freeman. I am going along with you. The transfer of heat from the furnace A of Johnson is by means of ducts, is it not?

A. Yes, sir.

Q. Now, in the Sweatt patent how does the heating medium get to the room?

A. It would come from the generation of steam in a steam boiler, for one example.

Q. And that steam in the steam boiler is the same steam as in the radiator, is it not?

A. Yes, sir.

Q. So that the radiator of Sweatt is, in effect, the heat producing medium, is it not, the same as the member *a* in Johnson patent?

477 A. Yes, sir.

Q. And in the Sweatt patent there are no ducts for transfer of the heating medium from the place of its creation or formation to the rooms to be heated other than the steam pipes themselves, is that correct?

A. As shown in the Sweatt patent, that is all.

Q. Well, we are talking only about the Sweatt patent.

A. Yes.

Q. So that the heating medium from down in the basement or the central heating plant passes into the rooms to be heated independent of any forced draft, is that correct?

A. Yes.

Q. So that regardless of how hot the central heating plant reached in the Sweatt system, there is not anything at or within the environment of the heating plant that would help remove any hazardous condition, such as overheating, is that not so?

A. Well, there is no showing in Sweatt of the central heating plant.

Q. Now, you know enough or you are expert enough in this field to know that in heating plants of the steam type that they do not have any fans or any other cooling devices blowing over the heating plant to cool them off. You know that, do you not?

478 A. Yes.

Q. So that when I told you that in the Sweatt device or system following the Sweatt disclosure, which is a steam operated job as distinguished from a hot air furnace, the problem is different than where you use a furnace and then pass air over the furnace, is that not so?

A. The difference resides, of course—

Q. What is that?

A. The difference resides, of course, in that the air in Freeman is heated within the furnace.

Q. And that is where the danger occurs in the event of overheating or in the event that you failed to turn off combustion; that is the source of danger, is it not?

A. Yes. I would like to say, Mr. Freeman, not in argument, but to go back—

Q. Go right ahead.

A. —to your earlier question, when you referred to the Sweatt patent as not showing, in connection with the central heating plant—I believe I am setting up what you said.

Q. Yes, go right ahead.

A. No device responsive to relieve a dangerous pressure condition in the central heating plant—am I expressing something you said?

479 Q. I never used the term "pressure," because I understand there is a difference between pressure and temperature.

A. To relieve a dangerous condition, or whatever you

may term it. Well, of course,—am I right? I do not want to go off on something you have not asked me. I believe you asked me something in connection with Sweatt I could not quite get at that time that pertained as to whether or not Sweatt showed any device functioning in connection with the central heating plant to prevent dangerous conditions there, and I replied of course Sweatt did not show the central heating plant. It may be that you had in mind, as I was trying to get it, that there was no electrical connections or electrical devices accomplishing that, as does the patentee Freeman, but, of course, if there were no electrical apparatus tied up with that central heating plant, I know of no steam pressure system that would not use a mechanical form of limit device, such as is termed in connection with steam a blow-off valve, which in a mechanical way would protect the boiler. Now, if we are talking about apparatus which may serve to prevent dangerous conditions in a heating plant, perhaps we better associate them with automatic electrical control devices.

480 Q. For warm air furnaces?

A. For any type of a furnace, and their association in an electric circuit, because when you ask me, "Is there no limit device?" I cannot very well say there is not when there are mechanical devices which serve that purpose.

Q. There is a different problem in a warm air furnace than in a steam plant, is that not so?

A. In what respect, as to overheating?

Q. Yes.

A. I think you wish to prevent hazardous conditions in any heating plant, whether it is warm air, hot water or steam, and there are devices that are made respectively for each of those types of systems.

Q. And those are different devices?

A. Naturally, one has to respond to water temperatures and one to steam pressures and one to warm air temperatures, so the same device would not fit in all the systems.

Q. That is what I am getting at. The same device will not fit in all systems.

A. But there are limit devices for each.

Q. So that in Freeman you agree with me that when you have a hazardous condition, that is, the tempera-

481 ture within the furnace bonnet has attained a degree higher than 300, using your own figure that you gave

us the other day, the burner will stop or the dampers will close so that combustion is checked and then the fan which served to distribute the heating medium to the rooms to be heated will pick up that hot air within and around the combustion pot of the furnace and deliver it to the rooms to be heated. That is a correct statement, is it not, of Freeman?

A. Yes, with this understanding, of course, that the room temperature has not reached its desired degree. With that understanding I would say yes.

Q. That was part of my understanding.

A. All right.

Q. So that the distributing means for getting the heat from the basement up into the rooms to be heated then functioned not only to get rid of the accumulation of heat and deliver it to the rooms to be heated, but also served another function, and that was to reduce the hazardous condition as quickly as possible; am I correct in that statement?

A. You are, again assuming—

Q. That the thermostat is still calling for heat?

A. Because if it should become satisfied at that mo-
482 ment you could not utilize the fan then to get rid and reduce that dangerous condition as exemplified in Freeman.

Q. Furnace systems are usually made and the devices are set for normal operation, and when we talk about a hazardous condition we are both talking about something out of the ordinary or out of normal, is that correct?

A. That is right.

Q. So we were both talking then about the hazardous condition where the room thermostat still demanded heat, but the limit switch, the safety device, stepped in, did the job, and then in doing its job, the fan did two jobs,— it tried to satisfy the thermostat by getting heat to the room. Is that correct?

A. Yes.

Q. And it likewise did another job, and that was to cool the combustion pot or the furnace proper as quickly as possible?

A. Under your assumptions, that is correct.

Q. Let us turn to Cross patent No. 1,758,146, and will you point therein to any instrumentality which serves the function of the device 24 of Freeman to bring about a sequence of operation as called for in the Freeman patent?

A. There is none.

483 Q. Now, you were asked by the court yesterday with respect to the Cross patent and you referred to the device which brought about an additional shot of coal into the combustion pot upon fall of temperature, and that is the thermostat position directly above the combustion pot in Figure 1 and referred to specifically in Figure 2 as element 38; that is correct, is it not?

A. Yes, sir.

Q. And in Cross there is likewise a room thermostat generally exemplified by the reference numeral 22?

A. Yes, sir.

Q. Now, I understood you to say that that was Freeman yesterday. Today I understand you to say that it meets only a part of Freeman.

A. If I conveyed to you any impression of that kind, I shall make my statement here that the likeness that I made to Cross with Freeman was in respect to the function of the room thermostat which stopped both the fan and the stoker when the room temperature reached the proper degree. That is the function of the thermostat 18 of Freeman, to do that very thing, and I only made reference to that portion of Freeman which is found in the Cross patent.

484 Q. So that in Cross, if the room thermostat 22 were demanding heat and the windows in the room were open so that the thermostat would not be satisfied, the furnace would keep on burning and fuel would keep on going into the combustion pot so long as there was fuel there, and you might burn up the furnace or the house without any device stepping in and stopping such a condition. Am I correct in that statement?

A. You are, and I might state—I did not quote this in my direct examination, but the Cross patent related to furnace construction as well as to the control operation of a stoker and fan, and this may account for—

Q. Are you supposing now?

A. No, I shall say that the specification—

Q. Let us just stick to what Cross said. If you want to read from Cross, go right ahead.

A. All right, sir. Cross states in his patent at page 3, column 1, line 20:

"In the construction of the heat exchanger 1, the relation of heating surface to fuel burned is at least that of 200 square foot surface per 1000 B.t.u. produced per minute. When this relation is used the stacked temperature is ap-

proximately 150 degrees Fahrenheit (a temperature well below the kindling temperature of soot or wood)."

And further on he states in line 34:

485 "It is a well known fact that a large portion of the fires in domestic dwellings are occasioned by overheating of chimneys or flues connecting with the chimneys; a condition occasioned by high stack temperatures. By the use of the present invention these excessive stack temperatures would be impossible, as it would be impossible to operate the system so that the stack temperatures would rise above the kindling temperature of wood, as previously stated."

Cross explains by this construction that he has, at least to his mind, provided a construction that reduces the fire hazard which he said was a common thing to occur by overheating the chimneys or flues by raising temperatures up to the kindling point of wood. There is no showing in the Cross patent of a device responsive to temperatures which will check stoker operation to prevent high temperatures. There is no device shown in there. He explains the manner in which he has constructed his furnace so that he believed he eliminated fire hazards.

Q. By his system?

A. By his system and construction, yes, sir.

Q. And that system is disclosed in Figure 1 of the Cross patent drawings, is it not?

A. Yes, sir.

Q. Now, do you have a copy of McCabe patent No. 1,734,015?

486 Mr. Freeman: Q. You spoke about the structure of patent No. 1,734,015 as controlling the make and break of two circuits, am I correct?

A. Yes.

Q. And you compared the structure of the McCabe patent with the definition in a license agreement offered by Minneapolis-Honeywell Regulator Company to the Mercoid Corporation, did you not?

A. Yes, sir.

Q. Now, the McCabe patent No. 1,734,015 could not be substituted for an M-80 and get the sequence of operation that you get by use of your M-80 in a furnace system?

A. No, sir.

Q. So that even though you have a single instrument that makes and breaks two circuits, as you describe in McCabe patent No. 1,734,015, you could not pick up that

instrument and use it in lieu of an M-80 and obtain the sequence of operation called for in the Freeman patent, could you?

487 A. I believe, Mr. Freeman, that that might be possible. If I might have the Figure 50 control.

I have the Mercoid Figure 50 control which embodies the instrumentalities shown in the McCabe patent 1,734,015, to which is connected the thermal element which causes expansion of the power element in the switch casing or contraction of that element. As shown in the McCabe patent, this instrumentality may be provided with two switches for two-circuit operation, and it would appear to me, just for example, claim 1, that if we had the two switches as shown in the McCabe patent in the Figure 50 and inserted it in the Freeman patent furnace, in the dome, and then read this claim 1—

Q. Of Freeman?

A. Yes, sir; "combination of apparatus for controlling the rate of combustion"—that is the stoker—"and the rate of supply of a heat conducting medium"—the fan—"thermostatic apparatus responsive to furnace temperature"—the Figure 50 I just referred to with the switch structure disclosed in the McCabe patent 1,734,015—"connections between the control apparatus"—namely, the stoker and the fan motor—"and said thermostatic apparatus"—the Figure 50 described—"by means of which said control apparatus operates to check combustion"—we stop the

488 stoker—"while supplying said medium"—we run the fan—"when furnace temperature exceeds a predetermined degree." With this device in the furnace, if it functioned at 200 degrees, we would open one switch which would be placed in the red circuit stopping combustion, and we could close the other switch at that temperature, which would complete the blue circuit, permitting the fan to run. In so far as the claim defines that, I believe what I have described would meet it. I do not know how many others there would be of the same kind that could be met by what I have set up here.

Q. And do you read then the Freeman patent to mean that the fan only operates upon an abnormal condition, or do you read the Freeman patent to mean that the fan operates also upon a normal operation of the furnace?

A. The claim 1 defines—

Q. No, I am just asking you about what you read the patent, and if you will restrict your answer—

A. All right.

Q. —to what I ask, we will get along so much faster.

A. The description of the Freeman patent invention is made in connection with his drawings and what he shows in his drawings is one arrangement which provides for the fan to operate before we reach excessive tempera-
489 tures and also permits the fan to operate after we have reached excessive temperatures, where you then may operate to shut down the burner, as exemplified in his drawings and described in his specification.

Q. That is, Freeman permits the fan to operate even though you never attain a 300 degree high temperature?

A. Yes, sir.

Q. And Freeman also provides for the operation of the fan upon a temperature in excess of 300, does he not?

A. Yes, sir, because the fan switch circuit is closed at much lower temperatures.

Q. At much lower temperatures?

A. Yes, sir.

Q. Now, with your Figure 50 which is—it has no exhibit number—which you say is embodied in McCabe patent No. 1,734,015, Mercoid Exhibit WW, you would only get operation of the furnace fan upon abnormal operation of the furnace, is that correct

A. This device is, as specified in the literature, adjustable. With this instrument we could adjust it. To operate somewhat below what would be classified as abnormal temperatures, which nevertheless prevent abnormal temperatures from occurring, and at the time of operation, say instead of 300, 250 degrees, we would then operate the
490 fan. The operation would take place at the time the device responded to that temperature condition.

Q. Let us see if I can put it in such terms that I will understand your answer. Can you, reading Figure 50, have the fan running and the burner running at the same time?

A. No, sir.

Q. And it is desirable, is it not, when the burner runs in response to the request by the room thermostat for heat to get that heat delivered to the room by forced draft, is that not so?

A. I would say that that is not always—that may not always be considered essential, in making that statement I will say to you, Mr. Freeman, that the Freeman patent in disclosing this invention by its drawings has limited the

application of the connections between the thermostatic apparatus, the stoker and the fan, to one in which the furnace which this combination is to control burns coal. Naturally, we are pushing or forcing coal or generating heat with coal in the furnace, even though we stop the forced generation of that heat, you can have left in the furnace a real good hot fire bed with possibly a lot of unburned coal in it, so even though we have checked operation of the stoker motor, for example, we still have

491 left in the furnace this burning mass of coal so that we could then, after we stopped or hoped to check combustion, liberate considerably more heat, and with a coal fired job, it would be, I should say, an advantage to continue operation of the fan for that reason. Although we have checked combustion, we have left real hot burning fire coal in that which would continue to raise the furnace temperature. However, as applied to an oil burner or a gas burner, there is a somewhat different condition. In stopping an oil burner or a gas burner we actually terminate, cut off any further generation of heat, and since we do not encounter the condition of continued rise in temperature, upon the checking of combustion there it might not be necessary to continue operation of the fan, because we have checked at that very point; we have checked any further increase in furnace temperature, which is not so in a coal fire furnace.

492 Q. You don't know if it would be desirable to have the furnace go to a dangerous temperature before the fan started to operate, and thus get a cycle of operation where the fan would never come on unless the furnace of itself attained a hazardous or dangerous temperature; you would not call that good installation?

A. Not in that one arrangement, no, sir.

Q. And that is not what Mercoid recommends in its bulletins that it puts out to the trade as to connecting up the M-80?

A. No; we recommend the operation of the fan while normal temperatures prevail in the furnace.

Q. And normal temperatures in the furnace would prevail at the same time the burner was burning?

A. Yes, sir.

Q. So that in that case you would have both fan operation and burner operation simultaneously?

A. Yes, sir.

Q. And that would be impossible with your Figure 50 control, is that correct?

A. Arranged as I described it in the circuits of the two switches, that is right.

Q. Is there any arrangement in Figure 50 or in McCabe patent No. 1,734,015 that does anything other than
493 either making a circuit simultaneously or breaking a circuit simultaneously?

A. That is all.

Q. And that is what McCabe specifically says in his patent, is that not so?

A. Whether he says it or not, it is so.

Q. So that you could never get with the McCabe patent or your Figure 50 the sequence of operation which would permit checking of combustion and permit the fan to continue to operate, and I use the words "continue to operate" with respect to the fan?

A. As exemplified in his drawings, no.

Q. And Freeman in his patent specifically uses the word "continues" with respect to the operation of the fan, does he not, as distinguished from starting the fan after the limit switch has moved to open circuit position?

A. Yes, sir.

Q. I am now reading from line 17 on page 2, column 1: "The fan motor therefore continues to operate even though the furnace is overheated so long as the room temperature is not above the degree for which the thermostat is set."

You do find such a statement in the Freeman patent?

A. Yes, sir.

Q. Of course, that is what you understood was the
494 general subject matter of the Freeman patent after you read the Freeman patent?

A. Yes, sir.

Q. So that with the use of an M-50 you would get an entirely different sequence of operation or furnace control that what is shown in the Freeman patent, is that correct?

A. Yes. That is the Figure 50, Mr. Freeman.

Q. Yes.

A. We have an M control. I would not want to confuse the M control.

Q. I am referring to the control that you have on the desk.

A. The Figure 50.

Q. The Figure 50.

A. Yes.

Q. And I take it, when you compare Figure 50 control and patent No. 1,734,015 with the definition in the proposed license agreement that you had read the license agreement in its entirety?

A. In my testimony I answered questions put to me by Mr. Moore as he formulated, as he—

Q. Formulated is a good word.

A. (Continuing)—rendered those questions to me by reading from the definition.

495 Q. Did you know whether he read you the complete definition or only a portion of the definition?

A. I only answered what he read to me.

Q. Now that you have answered only what he asked you, I want to ask you whether or not you read the definition as found in the license agreement prior to the time you went on the stand to testify in this case?

A. I believe at some time or other I have read that definition. I didn't memorize its full contents.

Mr. Moore: The witness has not testified to having read the definition in his direct examination.

Mr. Freeman: I am talking about the definition in the license agreement.

Mr. Moore: He didn't say a word in direct examination about license agreement. I do not know whether he has ever read it or not.

Mr. Freeman: Q. Did you know as a portion of the definition which Mr. Moore read to you there was included in the same paragraph and in the same sentence of the definition the following: "Such structure when used as intended embodies the system disclosed in and claimed by Freeman patent No. 1,813,732," and I am handing you a copy of the agreement, that is, the proposed agreement or form of agreement, Mercoid Exhibit JJ?

496 A. What you have just quoted appears as you have said in the definition.

Q. And did you know at the time you testified yesterday wherein you carefully compared the definition with Figure 50 control and patent No. 1,734,015, that the portion I quoted you was a portion of the definition?

A. At the time the questions were put to me I do not believe I was at the time considering anything other than the questions put to me.

Q. Now, that you have the complete definition in front

of you, will you tell me whether you want to change your answer with respect to Figure 50 meeting the definition, keeping in mind when I talk about a definition, I am talking about all of it, not part of it?

Mr. Moore: What testimony are you referring to, Mr. Freeman? The testimony when he answered my questions?

Mr. Freeman: Yes, and when you told the court you were reading from the definition and that the Minneapolis-Honeywell was trying to collect a royalty upon something which Mercoid had made a long time ago, and that such articles were defined in a license agreement.

Mr. Moore: Well, then, how could the witness change his testimony when he only answered the questions I asked him?

497 Mr. Freeman: Do you want to concede that your questions were only directed to, say, 75 percent of the definition?

Mr. Moore: I am perfectly willing, not to concede, but to state that the explanatory clause at the end of the construction of the instrument I did not read.

Mr. Freeman: Q. Now, with the full definition which you have before you, as found in Mercoid Exhibit JJ, will you tell me whether or not Figure 50 or patent No. 1,734,015 issued to McCabe meets that definition, and again I call your attention to the fact I am talking about a full definition and not only portions of it?

Mr. Moore: In other words, you are referring to that part of the definition which defines the structure and that part which is self-explanatory of its operation; is that right?

Mr. Freeman: No. I am telling you any English dictionary contains every word that is found in Lincoln's Gettysburg speech, but it took a genius to put those words together to produce Lincoln's Gettysburg speech, and what I want here is everything and not only a part of it. I think my question is a fair question.

The Witness: A. I want to be responsive, as simply as I can here, but the Freeman patent does state this:

498 "Other variations in the details of the invention are possible without departing from the broader features thereof."

And the patentee cites various hook-ups which might otherwise be used. As I previously stated within the terminology of claim 1 as expressed, it would nevertheless

read upon a structure that included Figure 50 control, and with that understanding as part of the Freeman disclosure I would have to say—

Mr. Freeman: Q. You used the word "part"?

A. Well, claim 1 is one part of it.

Q. All right. Go right ahead.

A. (Continuing.)—I would say the definition still would be met by this Figure 50 control.

Q. That is the definition of the license agreement would be met by Figure 50?

A. Yes, sir.

Q. Although you just got through saying Figure 50 would not carry out the sequence of operation called for in the Freeman patent?

A. Claim 1 does not define the sequence of operation that in its entirety is represented in Figure 2 of the Freeman patent. It refers just to one temperature and that is the furnace temperature which exceeds a predetermined degree.

499 Q. Did you find any mention with respect to the definitions in the license agreement or proposed license agreement about the fan continuing to operate?

Mr. Moore: Would you mind reading that question? May I have the question?

(The question was read by the reporter as above recorded.)

Mr. Moore: May it please the court, this witness has not testified he knows anything about any of these licenses that have been put in here. Now Mr. Freeman is asking him if he found certain things in the license agreement.

Mr. Freeman: I limited my question with respect to the definition.

Mr. Moore: He has not even testified he read the definition, your Honor, on his direct examination. I don't think he is the individual that should be questioned in regard to the contents of the license agreement.

The Court: Do I gather the witness was asked something about something which counsel for Minneapolis contends is a part only of a definition? Is that it?

Mr. Freeman: That is correct, your Honor.

The Court: I think counsel for Minneapolis has the right, whether he refers to the paper or not, to state
500 what he regards as the whole definition and ask him about it.

Mr. Moore: He has stated that, your Honor, and that

is already in the record. Now, he is asking if he found anything else in the license agreement referring to these fans and motors.

Mr. Freeman: I am limiting it to the definition.

Mr. Moore: If you are referring just to the definition which the witness has in his hands, I have no objection whatsoever. But when you speak of a reference in the license, then, he would have to read the whole license.

The Court: Well, counsel says he is referring only to the definition. He is limited by his question.

The Witness: That is Section 1, Mr. Freeman, under Definition.

Mr. Freeman: Yes.

Mr. Moore: To make the record clear, what is the question now the witness is attempting to answer? Can you read it?

(The question was read by the reporter as above recorded.)

The Witness: A. I do not find in here any reference to the time of operation of the fan, other than it is hooked up to an apparatus temperature responsive in which one 501 of said circuits is controlled by the apparatus being established on temperature rise and another being established on temperature fall.

Mr. Freeman: Q. Now, Mr. Black, are you telling us that you saw the full definition of the license agreement for the first time when I handed it to you today?

A. No, sir. At some time, and I believe it has been quite some time, I did see this before.

Q. And you knew, did you not, that Mr. Moore was going to ask you with respect to the definition contained in the license agreement before you began testifying?

A. Yes, sir; as to the structure defined therein.

Q. And did you know for the first time today that you were to refer to only a portion of the definition as distinguished from its entirety?

A. Yes; I knew the questions were directed to the structure of the temperature responsive switch.

Q. And you knew there was omitted, or you were not questioned with respect to the structure when used as intended, embodying the disclosure in the claims of the Freeman patent? You knew that was omitted?

A. Not particularly, Mr. Freeman. At the time Mr. Moore referred to this definition, in so far as I am concerned, it was related only to the structures. What

502 his intention was and what he wished to show by such questions as he put to me was something that was of his interest. I did not question his motives at all. I answered the questions as he put them to me.

Q. No, I am not questioning his motives either. I am asking you what you knew at the time you testified.

A. At the time there was any discussion between Mr. Moore and myself relative to anything forming a part of a definition, I concerned myself not with what the full definition was, if it was more than what Mr. Moore was concerned with, but I was concerned with only—

Q. What he asked you?

A. (Continuing.)—with what I found in Mercoid controls, that he stated to me was a definition.

Q. You agree with me now, then, the questions you were asked did not cover the full and complete definition as specified in the license agreement?

A. Well, as I said previously, there is, as far as I am concerned, the possibility, or my belief that quite probably the full definition would still cover it.

Q. Do you know whether or not Mercoid Corporation ever recommended or made any wiring diagrams and furnished them to the trade using a Figure 50 to carry out and perform the sequence of operation of a warm air furnace?

503 A. Yes, sir.

Q. That is a sequence of operation where both the fan and the burner motor operated simultaneously?

A. That gets me into a little involved answer, Mr. Freeman.

Q. I am talking about Figure 50.

A. Yes, sir.

Q. Which has two switches on it?

A. Yes, sir.

Q. To control two circuits.

A. Shall I say this? I don't know if I am stepping over my bounds here or not, but I am aware of what was given as testimony in the Bloomington depositions, and in answer to your question I shall say in one of the installations there was employed a Figure 50 control having two switches in it, and that control when it functioned stopped the burner and at the same time completed the circuit to the fan.

Q. Is that your understanding of the Bloomington depositions?

A. In one of the installations that operation would take

place in a Figure 50 control having the two switches we have been talking about, which operate simultaneously.

Q. So that upon the rise of temperature one switch 504 moved to open circuit position, and then for the first time another circuit was closed, which for the first time brought into operation a fan; is that your understanding of the deposition?

A. Not for the first time, but the action of the device in stopping the burner did continue in that case or provide that the fan run for a longer period of time, because in that installation if that were not present the apparatus normally controlling the fan would have almost simultaneously with the stopping of the burner by the limit control functioned to stop the fan. It was desired the fan continue to run after the burner stopped, so Figure 50 included in the two switches which we will say at 300 degrees responded so as to open the burner circuit and close a fan circuit, which otherwise would have been interrupted so the fan would have continued to run.

Q. So that the opening in Figure 50 of one circuit likewise closes another circuit, is that correct?

A. Yes, sir.

Q. And vice versa?

A. Yes, sir.

Q. So that going back to Bloomington now, and your understanding, the fan was already running?

505 A. Before we reached 300 degrees perhaps.

Q. Even though the circuit which you now inject into Figure 50, the second circuit, it was in open circuit position?

A. Yes, sir.

Q. Now, will you give me any literature put out by the Mercoid Corporation where it recommended the use of Figure 50 as a fan and limit control in connection with a forced draft warm air furnace installation?

A. They have no literature covering Figure 50 showing or recommending its application as a combination control, and wherein you would control from the one instrument the fan and the burner. I am referring to the installation that was made that incorporated that structure.

Q. With respect to your testimony about the Bloomington situation, I take it you have read the Bloomington depositions?

A. Yes, sir; sometime ago. My familiarity with the circuit, however, has been somewhat of recent date because

I colored up the enlargements of the drawings that were introduced in evidence at that time, and I understood the circuits upon which I was working.

Q. You took certain of the circuits and with your familiarity with the circuits you colored them up?

506 Mr. Moore: No, he didn't say that. He colored the original drawings, the colored drawings.

The Witness: A. I didn't apply my free understanding of what I saw in there. I colored the diagrams to correspond with the diagrams previously introduced at the time of the taking of those depositions, but I appreciated, having read sometime ago the depositions, what they represented, and knew their operation.

507 Q. Now will you turn to McCabe patent No. 1,817,634 and tell us whether it worked with respect to the making and breaking of two circuits in the same manner as does patent No. 1,734,015?

A. In the same way, yes, sir.

Q. Both circuits are made simultaneously and both

508 are broken simultaneously?

A. I believe I understand you, yes, that is, the two switches move simultaneously together.

Q. And there would never be any situation with respect to the structure of patent No. 1,817,634 where one switch would be on and the other switch would be on?

A. As shown in the patent, no.

Q. And the patent speaks about making one circuit when the other is broken, is that correct?

A. The patent so states, yes, sir.

Q. And I take it you are now looking at that patent No. 1,817,634, particularly page 4, column 2, line 10 of the patent?

A. Line 10, did you say?

Q. Yes.

A. I was looking at another point, at another place that made the statement.

Q. But the statement is contained in the patent or a statement is contained in the patent to the effect that one circuit is broken when the other is closed?

A. Yes, sir, that is correct.

Q. And is that true also of the other or third McCabe patent No. 1,834,288?

A. Referring, I suppose, to Figure 3?

509 Q. I am referring to the structure wherein one circuit is broken and the other is made, or vice versa.

A. In these circuit arrangements shown in Figure 3, one switch opens at the time the other switch closes.

Q. So that all three of the McCabe patents which have been here referred to, one of which has been pleaded and the other two to meet the so-called proposed license agreement, all operate substantially the same in so far as making and breaking the electric circuits is concerned?

A. Yes, sir.

Q. There has been some mention here made of a so-called two-speed operation for a fan. Would it make any difference so far as the sequence of operation is concerned whether the fan worked at one speed at one time or whether the fan worked at another speed at another time?

A. You are referring to the Freeman patent?

Q. I am asking you whether in so far as the sequence of operation is concerned does it make any difference whether a fan works at one speed at one time and at another speed at another time?

A. Only as to the amount of air being circulated, that is all.

Q. So that taking the Freeman patent by way of illustration, when the fan switch moves to closed circuit 510 position and the fan is then operated at, say, 1500 r.p.m., would there be any difference in so far as sequence of operation is concerned if at some time the switch 23 when it closed operated the fan, say, at 3000 r.p.m.?

A. I do not see anything in the Freeman patent which changes the speed of the fan in any way, but the fan would be caused to operate as the temperature rose in the furnace. There is a device there, 23, which at a predetermined temperature will close the circuit to the fan, but at other temperatures above that I do not see anything in Freeman to change the speed of the fan. How it will be done from the disclosure of Freeman I do not know, but the fact is that the fan at a temperature rise might be caused to operate at a higher speed.

Q. The Freeman claims call for a combination of circumstances which brings about a sequence of operation, do they not?

A. Yes, sir.

Q. And in so far as carrying out that sequence, it would not make any difference whether the fan worked at one speed or at two speeds, would it, in so far as the sequence of operation is concerned?

A. In so far as placing the fan in operation at the
511 lowest of the predetermined temperatures, I should say it does not make any difference, but of course there is a sequence of control operation in there that would have to be considered as affecting the higher rate of speed, if it should occur. As I said before, regardless of the speed of the fan it will take place upon a rise in temperature. Freeman shows the operation of the fan apparently at one speed as the temperature increases in the furnace. Now, it would continue to operate, naturally, as long as the temperature went higher, but as far as control of sequence is concerned, there would have to be something take place in there to take care of the additional speed of the fan.

Q. But in so far as the Freeman concept is concerned or that point of novelty that we have discussed, it would not make any difference whether the fan worked at 1500 r.p.m. or 1800 r.p.m. or 3000 r.p.m., would it?

A. No, presuming it is placed in operation on a temperature rise.

Q. So that the claims of the Freeman patent would be embodied in a structure which at one time might work at 1500 r.p.m., speaking of the fan, or at another time might work at 1800 r.p.m., speaking of the fan?

A. I believe so, yes.

512 Q. So that you could make a structure wherein the fan motor operates at two different speeds and still have the embodiment of the Freeman contribution or concept?

A. I suppose the claims might be given that scope, that would cover such an arrangement. It is not shown, of course.

Q. There is not anything in the claims that you have read that would say the fan had to operate at any given speed or at any number of different speeds, is there?

A. No, sir.

Q. And, as we understand it, so long as the fan operates, whether it operates at one time at a low speed and at another time at a higher speed, you still have the Freeman mode of operation, do you not?

A. Yes, sir.

Q. Do you have any literature illustrating any structure like the structure shown in patent No. 1,734,015 or patent No. 1,817,634 or patent No. 1,834,288, showing the control of a furnace fan and limit switch in a forced air circulation furnace? I said literature. You can use any

of the Mercoid wiring diagrams, if you have them, where any one of those three structures were shown and recommended by the Mercoid Corporation in its publications for use for controls and furnace fan switches which in
513 turn controlled the fan, and the limit switch which in turn controlled a burner motor, without change in the structures.

A. I believe your question would bring or would include this structure we talked about before, as shown in Mercoid Exhibit BB-1.

Q. I am asking about anything. Perhaps I should have said prior to the Freeman filing date.

A. No, sir, I cannot produce any such literature.

Q. Now, will you tell us when Mercoid first began to make a control, a unitary structure, where two switches operated to provide two closed circuits at the same time, or one opened and the other closed, or any single unitary structure whereby you could get the sequence of operation called for in the Freeman patent?

A. You wish to limit it to the sequence of operation called for in the Freeman patent?

Q. Will you give me, if you have it, any literature, or tell me when you made a control—I don't care which—where you had two closed circuits and where you could have one open circuit and one closed circuit out of the same instrument?

A. Well, for one—

Q. Now, I am interested first, in a single instru-
514 ment to do those things, not a multiplicity of instruments.

A. No, sir. I understand. I can show literature which covers what we talked about this morning, devices such as the Figure 50, which employs two switches operating as it does in Figure 50. Are you interested in that type of devices?

Q. I understood the Figure 50 to provide a device where you had two circuits either made simultaneously or two circuits broken simultaneously. What I want to get is where you can have two circuits made at the same time, or one of these circuits broken at one time and another of those circuits broken at another time. Perhaps I could ask that question a little better. One where on the temperature rise one circuit is open and the other is closed, and as that temperature continues to rise both circuits are

closed, and as the temperature continues to rise still further one circuit opens and the other remains closed.

A. No, sir, I have no literature that would show a device meeting the requirements of your last question.

Q. The M-80 would meet those requirements, would it not?

A. Would you mind repeating that sequence again?

Mr. Freeman: I will ask the reporter to read it.

(Mr. Freeman's question was read as follows:

515 "One where on the temperature rise one circuit is open and the other is closed, and as that temperature continues to rise both circuits are closed, and as the temperature continues to rise still further one circuit opens and the other remains closed.").

The Witness: A. That is possible to accomplish or is found in the M-80 control.

Mr. Freeman: Q. And when did your company first put out any literature illustrating that sequence that I last referred to, with respect to the making and breaking of electric circuits?

A. To the best of my knowledge, that occurred in 1937.

Q. And the M-80 control, which is here in court as Mercoid's Exhibit PPP, when connected up as recommended up by the Mercoid Corporation, will bring about a sequence of operation where initially one switch is closed and the other one is open and as the temperature rises both switches will be closed and as the temperature continues to rise still further the one that was closed at the outset will open and the one that was open at the start will remain closed, will it not?

A. Yes, sir, that is possible, with proper adjustments of control.

516 Q. And that is the sequence of operation recommended by the Mercoid Corporation for its M-80?

A. That is the operation that occurs when the M-80 is used in the wiring arrangements disclosed in the Mercoid literature.

Q. And that is the arrangement or sequence of operation when the M-80 is connected up as Mercoid recommends in its drawing No. 2407, a Mercoid wiring diagram, Bulletin MH, Exhibit 11, is that correct?

A. Yes, sir.

Q. And likewise that is the sequence of operation illustrated in drawing No. 2403, Mercoid wiring diagrams for

oil burner installations, illustrated in MH, Exhibit No. 10, is that correct?

A. Yes, sir.

Q. And I read from MH, Exhibit 11, with respect to drawing No. 2407, as follows:

"Should the furnace at any time reach the temperature at which the limit control is set, the stoker will stop. However, the circulating fan will continue to operate."

That is a correct statement of the sequence of operation as obtained by use of the M-80, following Mercoid's installation instructions?

A. That statement properly describes the opera-
517 tion disclosed in the drawing.

Q. And likewise Mercoid tells its prospective customers that if you want a hookup as above specified you should order among other controls "one type M-80 Mercoid combination fan and limit control," is that a correct statement?

A. Yes, among other controls is listed the type M-80.

Q. So that Mercoid tells its customers and prospective customers that if you make an installation following the circuit drawings and you want a sequence of operation which is explained in detail, you then order, among other controls, one type M-80 Mercoid combination fan and limit control, that is correct, is it not?

A. That is correct, and apply them to the stoker apparatus and the fan apparatus.

Q. And when you say apply them to a stoker and fan apparatus, you mean in accordance with the wiring diagrams and the recommended way of application as specified by the Mercoid Corporation, do you not?

A. Yes. The pages there disclose all of that, yes.

Q. Will you go with me as far as saying that claim 1 of the Freeman patent reads upon an installation made in accordance with the wiring diagrams and instructions ap-
pearing on MH, Exhibit 11, following Mercoid draw-
518 ing No. 2407?

A. Yes, sir.

Q. And how about Claim 9?

A. No, sir.

Q. Why not?

A. Because Claim 9 specifies besides the fan and limit switch that there be other thermostatic apparatus, namely the room thermostat interposed in said circuits in series connection with said first mentioned thermostatic appa-

ratus, responsive to the temperature of the space to be heated and adapted to interrupt the circuits to both combination control apparatus and the motor of the fan. On this diagram, the Mercoid drawing No. 2407, when the thermostat opens a switch it does not stop operation of the fan motor. It continues.

Q. How about claim 6?

A. Yes, claims 1 and 6 are in the same group; they both are readable upon this drawing.

Q. And by this drawing you are referring to drawing No. 2407, wherein an M-80 is used as exemplified by MH, Exhibit 11?

A. Yes, sir.

Q. Turning now to the M-80 as used in an oil burner installation, as exemplified in drawing No. 2403, found
519 in Mercoid wiring diagram bulletin MH, Exhibit 10, do you find it possible to read claims 1 and 6 upon an installation which follows drawing 2403?

A. Yes. Claims 1 and 6 are readable upon this drawing No. 2403.

Q. Now will you turn to illustration No. 8 forming a part of your bulletin published in May of 1940, known as your form L-4, and tell me whether or not claim 4 reads on that type of an installation wherein an M-80 is used?

A. Yes, sir, claim 4 is readable.

Q. And likewise claim 9 would read on it?

A. Yes. They are of the same group.

Q. I might add that claims 1 and 6 would also read upon the form of installation referred to in your illustration No. 8, wherein a type M-80 was used?

A. Yes, sir.

Q. Mr. Black, you testified on direct that you made an investigation and began looking through your records with respect to the Freeman patent. Would you tell me about when it was that you made this investigation?

A. I would say in the late part of 1940 to the early part of 1941, somewhere about in there.

Q. Were you making your investigation of the Freeman patent when you called at the Portner place of busi-
520 ness in April of 1940?

A. No, sir.

Q. What were you doing then?

A. As to the investigation?

Q. No, what were you doing with respect to the Port-

ner so-called installation in April, 1940? I understood you to say you were there first in April, 1940.

A. That is correct. I believe the license was offered Mercoid in about the first of the year 1940 and I believe I made some investigations of the engineering department relative to the procurement out of our files of wiring diagrams and such information as would apply to such a system. We were desirous to find some installation of that kind. In the spring of 1940 Mr. McCabe and myself made a few trips out to the western suburbs, which finally wound up in Mr. Portner's establishment, at which time we found that installation.

Q. And had you at that time had the correspondence from Portner?

A. As I recollect it, I did not. I checked that up when I returned.

Q. Do you know when the Portner correspondence first came to your attention?

A. I cannot say definitely, except that it was quite
521 some time or some time after I had made the trip out there. We did not know that the Portner installation existed when we went out there. It was after we had visited the place that our talk with Mr. Portner on questions relating to whether he had made such types of installations brought out the fact that he had done so in his own establishment.

Q. And where else did you go in connection with your investigation in these west end suburbs at the time you called on Portner?

A. We also made a call in Hinsdale, Illinois.

Q. And you made those calls without any leads or without any correspondence? You just sort of took a shot in the dark, so to speak?

A. No. The reason for visiting Hinsdale was that there had been discussions with men of the Holland Furnace organization, and through those discussions Mr. McCabe, who was very active in and around this territory back in those years, remembered having done considerable work with various of the dealers in Holland furnaces and he recalled these persons out in this territory when we visited and discussed the possibility of their having in that territory installations of the kinds we wanted which were put in at an early date.

522 Q. Then do I understand that Mr. McCabe was with

you in April of 1940 when you called at Wheaton, at Mr. Portner's place of business?

A. Yes, sir, he and I went there together.

Q. That was in April of 1940?

A. Yes, sir.

Q. And did you find the Holland furnace correspondence, marked Exhibit K-3, and the XXth Century Heating and Ventilating Company correspondence, marked Exhibit K-2, also referred to as Mercoid Exhibit GGG, at about the same time that you found the Portner correspondence?

A. No, sir. The Portner correspondence was one of the last things of all my searching that I discovered. As a matter of fact, it developed rather late, but there may have been correspondence relating to that subject. In my previous search I had not found it, I had not run across the Portner correspondence.

Q. Did you find the Holland furnace correspondence and the XXth Century Heating correspondence yourself?

A. Yes, sir.

Q. And did you look up that correspondence for and on behalf of Mr. McCabe or under Mr. McCabe's instructions?

A. Well, there weren't any particular instructions given for it. With my regular duties in this line of work, I
523 just went ahead and did it. I think it was my suggestion that I do so.

Q. And at the time that you were out at the Portner place of business with Mr. McCabe in April of 1940 did you and Mr. McCabe check the installation at that time?

A. Yes, sir, we observed the operation and, as I stated in my direct testimony, we manually operated the limit control to observe what happened after we shut down the burner.

524 Q. And then how soon after April of 1940 was it that you began looking for some correspondence or some records having to do with the Portner job or installation?

A. As I recollect, that came quite sometime afterwards, because we were quite satisfied at having found the installation, and as it later developed we thought it desirable to procure documentary evidence relative to the delivery of the devices which were installed in the installation, and in unearthing that in the files we found the balance of the correspondence which was introduced here.

Q. What I want to know is just when did this so-called unearthing take place?

A. I cannot specify the date. I did so much work on this off and on I do not know just exactly when I located this piece and that piece.

Q. Now, you knew when you saw the burner installation in April of 1940 that certain of the controls on that installation, as you saw it, were controls furnished by Time-O-Stat Company, or Time-O-Stat controls?

A. Did I recognize any such controls?

Q. Yes.

A. Yes, sir, I did. The name appeared on the instrument.

Q. Did you do anything to check up as to when 525 those Time-O-Stat controls were sold?

A. We did not. That was a competitive line. I would have no way of telling when those devices were sold.

Q. But those controls did form a part of the system, did they not?

A. Yes, sir.

Q. And those controls which you saw, that is, the Time-O-Stat controls, you say were for operating the fan back of the unit heater, is that correct?

A. Yes, sir.

Q. And you made no investigation as to what controls you furnished to Portner until long after your visit in April of 1940, is that correct?

A. It seems to me it occurred sometime afterwards, yes, sir.

Q. And you know that if those Time-O-Stat controls, which you say were made by a competitor, were put out within the last year or two they would mean nothing, would they, so far as the installation is concerned?

A. As I understand, the Time-O-Stat controls company became a part of Minneapolis-Honeywell Heat Regulator Company in about 1928. I do not know whether you could purchase an article of that kind two years ago or not.

Q. I will go back to 1934, when I am telling you 526 Time-O-Stats were sold.

A. I do not know that.

Q. Did you just assume because Minneapolis-Honeywell merged or took over the Time-O-Stat Company in about 1928 that Time-O-Stats were then off the market?

A. No. I would presume that they would not carry Time-O-Stat name plates. Well, perhaps they were. I

don't know. That is, perhaps they were sold under the name of Time-O-Stat controls in 1934. I would not know.

Q. And you made no further investigation with respect to that installation until recently, when you began looking for some additional correspondence or documentary evidence, as you called it, is that correct?

A. Yes, sir.

Q. Have you read the testimony of Mr. McCabe that was taken in this case?

A. I may have scanned it at sometime or other, yes.

Q. You know that Mr. McCabe was asked in September of 1940 to produce any and all circulars or drawings or diagrams with respect to the subject matter here that would show a sequence of operation as defined in the Freeman patent; you knew that, didn't you?

A. Yes, sir.

Q. And you knew that there was an adjournment
527 of the taking of that testimony from sometime in September until sometime in November; you knew that, didn't you?

A. Yes, sir.

Q. And you knew that Mr. McCabe produced certain of the letters that have been referred to by yourself, particularly the Holland furnace correspondence, Mercoid Exhibit K-3, and the XXth Century correspondence, Mercoid Exhibit K-2, also referred to as Mercoid Exhibit GGG, but no correspondence or anything was produced with respect to the Portner installation; you know that to be a fact, do you not?

A. I believe that is correct.

Q. Then, if I understand the investigation that you made with respect to correspondence, when Mr. McCabe was asked to dig up what his records would contain, he did not produce anything with respect to the Portner installation, although he was specifically requested to produce the earliest wiring diagrams or explanations that might have a bearing on the Freeman patent?

A. I do not believe he introduced other than what you received.

Q. You will recall that Mr. McCabe testified that he did not have any wiring diagrams, but that he had word pic-
tures, and when asked about word pictures he pro-
528 duced the Holland furnace correspondence and the XXth Century correspondence, and I think, if my

memory serves me correctly, another letter or two, but nothing with respect to the Portner installation.

Mr. Moore: May it please your Honor, if there are going to be any more questions along these lines I would request that Mr. Freeman read from the deposition what he asked Mr. McCabe to produce. My recollection is he asked Mr. McCabe to produce from the Mercoid records what recommendations they had made, wiring diagrams and the like. Now, this is not a Mercoid wiring diagram. That is one that Mr. Portner wrote up and sent into the Mercoid and is not part of the Mercoid suggestions. That is the reason Mr. McCabe did not put it in the record.

The Court: Is this an objection?

Mr. Moore: If he asks any more questions along those lines, yes, because this witness is not qualified to know why Mr. McCabe did this or did not do that. He has not testified to anything McCabe did.

The Court: Is there a pending question?

Mr. Freeman: What was that, your Honor?

The Court: Is there a pending question?

Mr. Freeman: I think not. I think he has answered it.

I might say the reason I am going into this is this:
529 I asked for certain preliminary information on adverse examination, because I wanted to know what this was all about, so we might plan for our case and not come into court with a lot of surprises.

Now, this witness is the man whom Mr. Moore qualifies to do all of the searching and investigating for Mr. McCabe and McCabe said, "I will have somebody make this investigation; I will go through my records," and we adjourned, and he went through his records and produced a part of it, but at that particular time when he testified back in September of 1940 and again when he came back in November of 1940, after I specifically asked him to introduce what records they had, Mr. Moore now says, "We did not have any wiring diagrams," but McCabe was smart enough to bring in what he called word pictures, and I am just wondering how it now happens that they neither had the so-called word picture—not that we concede that Portner is a word picture—nor had they the so-called diagrams when both Mr. Black and Mr. McCabe were out at Portner's place of business months prior.

Mr. Moore: But a public use was set up in the answer to the infringement pleading, your Honor, as to A. J. Portner of Wheaton, Illinois, and there is no surprise to

Mr. Freeman there. He could have investigated the 530 plant if he had wanted to.

Mr. Freeman: Mr. Moore, if you will tell me now that the controls that are in the Portner installation today were the controls that were put in there back along in January or February of 1929, then perhaps I can shorten my examination.

Mr. Moore: No, but Mr. Portner will tell you that, and the man who put them in, Mr. Hill, will also tell you that.

Mr. Freeman: Q. You do not know, then, when the Portner letter, written by Mr. Portner to The Mercoid Corporation, came to your attention?

A. Not as to a definite date, no.

Q. You do not recall whether it was before November of 1940 or after November of 1940?

A. I cannot say definitely, no, sir.

Q. And it might have been before November of 1940?

A. Possibly, yes.

Q. To that letter was attached the wiring diagram that has here been produced, so that the letter and the wiring diagram both came to your attention at the same time?

A. The whole of the correspondence was found in a bound volume, so it was all intact all together.

Q. And did that include likewise the invoice or 531 shipping memorandum from The Mercoid Corporation to Portner?

A. Yes, I believe it did. It was all bound together.

Q. All together?

A. Yes, sir.

Q. Filed one after the other?

A. Yes.

Q. I notice the dates are a couple of months apart.

A. Well, the corporation correspondence files have been gathered together and bound in bound volumes for storage, and I believe I am right in saying that all of the correspondence of that year with Mr. Portner would be contained in this one bound volume.

Mr. Moore: I may shorten the matter if I might state that those bound volumes will be produced by Mr. Owens, the vice president, when he testifies and identifies this correspondence, and they will show whether they were all bound together or whether they are dates apart, or what.

532 Q. Do you know whether there was any correspond-

ence between The Mercoid Corporation and Portner answering the Portner letter?

A. There is a memorandum on the letter in evidence of a recommendation by one of the Mercoid salesmen. I think this file—I wonder if we could procure that file? It might save a lot of trouble here.

Mr. Moore: It will take about ten or fifteen minutes to bring it over.

Mr. Freeman: Q. I am just asking as to what you found. I mean, you are the one that made the search?

A. It is all in the file, it is all bound there. I do not recollect whether there is a note to Mr. Portner saying that the suggestions or the questions he raised relative to his diagram are quite all right and we can furnish this or not. Being as close to Chicago as Wheaton is, it may have been that the salesman dropped out there.

Q. You are merely speculating now?

A. Yes. I would just like to see the file.

Q. I think it would be better if you would answer the question. If you know, all right, and if you do not, just say so.

A. The file is short.

533 Q. Do you remember running into any other correspondence with Portner with respect to this request of his and the subject when filling the order several months later?

A. I do not think there was a great deal of correspondence on that subject. There was correspondence with Mr. Portner on other matters that were carried on.

Q. Did you or Mr. McCabe make inquiry with respect to the Time-O-Stat controls on the Portner installation?

A. No, sir, we questioned, of course, the time of making that installation, and Mr. Portner satisfied both Mr. McCabe and myself that the installation was made as of the date he specified.

Q. That is, with the Time-O-Stat control?

A. Yes, sir, exactly the installation we viewed in his establishment is exactly as when he had it in operation as complete in 1929.

Q. Mercoid by any chance did not sell the Time-O-Stat controls that went on that job?

A. I hardly think so.

Q. You say you were satisfied with respect to the information that you obtained when you visited Portner in

April of 1940 with respect to the Time-O-Stat controls on that job?

A. Yes, sir; we carried on considerable conversation and discussion about the installation with Mr. Portner. I can tell you what transpired, but since Mr. Portner will be here as a witness—

Q. I wonder if you looked up any records there?

A. Sir?

Q. I wonder if you looked up any records at the particular time?

A. At Mr. Portner's establishment?

Q. Yes.

A. We inquired about it and he said he did not keep records back that far.

Q. So you had only his oral statement—not that we are questioning it at this particular moment—with respect to the use of Time-O-Stat controls which would serve the purpose of bringing on the fan at a predetermined temperature and turning the fan off at a predetermined temperature. You were satisfied with his oral statement?

A. Most certainly.

Q. And he had no records with respect to the use of the Time-O-Stat controls?

Mr. Moore: I think Mr. Portner can answer that. Mr. Black is not in a position to know what records Mr. Portner kept and what he did not keep. Mr. Portner is going to follow Mr. Black on the stand.

Mr. Freeman: I am not asking him what records Mr. Portner kept. I am asking him what he was given, if anything, by way of records to this witness or to Mr. McCabe.

A. Mr. Portner did not give us any records at all.

Q. And he had no records?

A. As far as I know, he had none.

Q. Now, when did you gather Mercoid literature, as you testified on direct examination?

A. As I stated, I believe that occurred in the late part of 1940 or the early part of 1941. There was some cool weather prevailing. I spent considerable time in making that search.

Q. And when did you make your validity search with respect to the Freeman patent?

A. I cannot say definitely as to the date of that either.

Q. About when; to the best of your recollection, Mr. Black?

A. I do not believe I can state a date.

Q. And I take it you cannot give us some date as to when you discovered the Peninsula Burner & Oil Company correspondence, as now exemplified by Mercoid's Exhibit CCC for identification?

A. Yes; I think this particular piece was found
536 fairly early, because some good number of years ago relative to questions involving controls of this character, there had been a previous search made of literature of this kind, and that particular correspondence had been retained in the Engineering Department, and it was through that particular small file that I first looked while looking through Engineering Department records, which brought about at an early date this particular correspondence.

Q. That is, sometime prior to September of 1940?

A. Yes, sir.

Q. And how about the Miller correspondence produced by Mercoid as its Exhibit DDD for identification?

A. I will say this was discovered at the later date.

Q. And when you say "at the later date," can you give me your best—

A. Through the winter of 1940-41.

Q. The winter of—

A. 1940 and 1941; that is, 1940 through 1941, or into 1941.

Q. And how about the Premier Warm Air Heater correspondence, Mercoid Exhibit EEE for identification.

A. That would be about the same time.

Q. By the way, do you happen to have the letter of
537 April 20th referred to in the Premier Warm Air Heater Furnace Company, to which Defendant's Exhibit EEE for identification is an answer?

A. I believe that will be found in the bound volume together with the one that was introduced.

Q. Was there any particular reason in some instances for using the correspondence sent to you by some burner manufacturer and your reply, and in other cases using only Mercoid's reply; was there any special reason in selecting them as you did?

A. Only that we took just such correspondence as was necessary to show the disclosure.

Mr. Freeman: Mr. Moore, you will make available, at least before you offer a portion of the correspondence,

the letter from Premier Warm Air Heater Company addressed to Mercoid Corporation, dated April 20, 1927?

Mr. Moore: I will be very glad to. I will have all those bound volumes over tomorrow morning, and when Mr. Owens identifies the various pieces of correspondence, before I offer them in evidence, I will let you look through the volumes.

Mr. Freeman: Q. Could you use an M-80 without change and make it function as it is intended to function
538 in an installation of the kind which has been here referred to so far as Portner's?

A. That instrumentality M-80 would not find any place in the Portner installation. A like control, however, could be used.

Q. It would not be the kind of control that is here involved; would it?

A. As here in evidence, no, sir.

Q. You referred to Peninsula Burner & Oil correspondence of January 14, 1926, Defendant's Exhibit CCC for identification, and if I understood you correctly, you said it was a word picture of Freeman, is that correct?

A. Of a circuit arrangement claimed by Freeman, yes, sir.

Q. And you likewise said that the Peninsula indicated a circuit of the kind that you have illustrated on Mercoid's Exhibit QQQ in the lefthand figure as you face the drawing, is that correct?

A. Yes, sir, as it involves the use of the furnace limit control 24 and furnace fan control 23.

Q. And I take it that from your knowledge of electric circuits that upon reading the correspondence produced as Mercoid's Exhibit CCC for identification, the circuit arrangement would all be in accordance with what you have illustrated on the lefthand side of Mercoid's Exhibit QQQ, is that correct, Mr. Black?

539 A. Yes, sir.

Q. And what you wanted the court to understand was that when you read the correspondence of the Peninsula Burner & Oil Company, Mercoid's Exhibit CCC for identification, you would then make a circuit arrangement as is now illustrated on Mercoid's Exhibit QQQ, the left end figure or portion of that exhibit, is that correct?

A. Well, not limited to the left. As affects the operation of the furnace limit control and a furnace fan control.

The lefthand portion you referred to, I do not wish to limit myself just to the blue fan circuit.

Q. The blue fan circuit plus the red circuit?

A. Yes, sir.

Q. That is, the blue fan circuit on the left end, together with the red circuit, illustrates what you call the device shown or described in words in the Peninsula Burner & Oil Company correspondence, is that correct?

A. Yes, sir, as it affects the fan and limit control. Yes, sir.

Q. So that we understand each other, you are now saying that you want this court to understand that the Peninsula Burner & Oil Company correspondence discloses the blue circuit which is made in a dashed line, together with the complete red circuit, is that correct?

540 Mr. Moore: Have you got a copy of that correspondence before you?

The Witness: A. I do not want to cause any confusion here either. As we have said before, there are two groups of claims in the Freeman patent, some which include the room—

Mr. Freeman: Q. First tell me what is disclosed in words in the Peninsula Burner & Oil Company, and I understood you to say it was this blue circuit in dashed lines and the red circuit. Now, if I am wrong, you go ahead and explain it.

A. As it relates to the function of the fan and the limit control.

Q. And that is the way you read the Peninsula Burner & Oil Company correspondence?

A. Yes, sir.

Q. And I take it, that that is the way you read the Miller Automatic Services' letter, Mercoid's Exhibit DDD for identification?

A. Yes, sir. As a matter of fact, that is the way I interpreted all of that literature.

Q. When you say "literature," you really mean the letters, the correspondence?

A. The correspondence, yes, sir.

541 Q. And so that we understand ourselves, your last answer includes likewise the Holland Furnace Company letter?

A. Yes, sir.

Q. And also the letter to the XXth Century Heating & Ventilating Company?

A. Yes, sir.

Q. Also the letter to the Socony Burner Corporation, dated December 20, 1927?

A. Yes, sir.

Q. And the Premier Warm Air Heater Company letter of April 22, 1927?

A. Yes, sir.

Q. And likewise the XXth Century Heating & Ventilating Company correspondence?

A. Yes, sir.

Q. Likewise the letter from Holland Furnace Company to Mercoid of January 11, 1929.

A. Yes, sir. This correspondence representing such disclosure as is claimed by all of the claims of the Freeman patent in the first group.

Q. Let us first get one understanding at a time so that I can follow what those letters tell you by the way of a diagram or wiring circuit, and even at the sake of rep-
542 etition I now am asking you whether or not as a result of those letters that you have read and that you have here referred to you then get a circuit arrangement illustrated in blue in the dashed line and illustrated in red forming a part of Mercoid's Exhibit QQQ, and I am excluding now from my question any reference to the middle or center blue diagram or the end diagram on the right side of the exhibit?

A. Yes, sir, as it relates to the function of the furnace fan and the furnace limit control.

Q. And the arrangement of the controls which you say functions the controls, as taken from those letters, is the arrangement that you have here outlined, limiting, of course, my question to the blue dash line on the left-hand side, is that correct?

A. Yes, as it involves, as I said before, a limit switch in the red circuit and a fan switch in the blue.

Q. Now, will you please explain to me what is meant in the Mercoid letter to the XXth Century Heating & Ventilating Company wherein it is stated:

"Your favor of September 10th noted, and in response we wish to state that we could furnish our Figure 50 control with standard range 250 to 300 degrees Fahrenheit mounted in the drum of the furnace and connected in the line ahead of all other controls."

543 What is meant by that phrase?

A. The phrase I imagine you are referring par-

ticularly to is "connected in the line ahead of all other controls," is that correct?

Q. Now, would you say that the limit switch 24, which is what you call Figure 50 and which is the item referred to in the letter that you just read from, is ahead of the fan control 23?

A. No; reference in the letter to the fan control is made in another paragraph. It specifies in the next paragraph where the fan control must be placed. I think I qualified that statement in this letter on direct when I said that the term "connected in the line ahead of all other controls," applied to other controlling apparatus in the burner circuit, and I made mention of the fact that in connection with oil burners there are other safety controls which function to prevent other abnormal things from occurring through the operation of an oil burner, and that this statement referred then that the limit control would be connected in the line ahead of all other controls in that burner circuit.

Q. When you talk about burner circuit, are you talking now only about the red circuit or are you talking now about the dash line blue circuit?

544 A. I am talking only about the red circuit.

Q. So that it would not make any difference where the branch circuit which controlled the fan switch and the fan motor were positioned then in so far as your present explanation is concerned?

A. Oh, yes. In fact, as I said, the second paragraph tells where the fan control must be connected. I shall read the last sentence of the second paragraph referring to the furnace fan control, the last sentence: "This latter control would be connected in series with the line and fan motor," which takes it outside of the burner circuit.

Q. In series?

A. With the line and fan motor, the limit control being in the burner circuit line ahead of all other burner controls.

Q. And in series with the fan control?

A. No, sir. The first paragraph, referring to the limit switch, says that it must be connected in the line ahead of all other controls. That limit switch, which stops the burner, would then be in the burner circuit. How many controls you have in that circuit would depend upon the type of complete system that was used. Then the second paragraph particularly states that the fan control

545 would be connected in series with the line and fan mo-

tors. We have a source of power here and we run that off to include the limit control ahead of all other burner controls, and we still have this line to which we can connect the fan switch to the fan motor. That is what is represented in that drawing, and that is the proper, I believe, interpretation to place upon this letter.

Q. Where do you find in that letter any mention then that the fan circuit is to be connected to the line ahead of the limit switch?

A. Well, the letter goes on further to state regarding the fan, and it says: "It will continue to run after the burner is off." Now, if the limit control were in the series circuit in connection with the fan and it opened to stop the burner, it would also stop the fan. The letter specifies that the fan should run after the burner is shut off. The limit control in the burner circuit would stop the burner and the letter says that thereafter the fan will run. So it could not be in series circuit in connection with the limit control.

Q. Then reading the letter that you now have in your hand, the only form of circuit that you can get is here exemplified in red and the blue dash line on Mercoid Exhibit QQQ, is that correct?

546 A. Yes, sir, that is the only circuit that can be made, from the description and specification set forth in this correspondence.

Q. Now will you look at the Holland Furnace Company letter of January 15, 1929, and tell us if it to specifies in detail Exhibit QQQ and the left end blue circuit.

547 Q. Mr. Black, you were at the Portner installation yesterday, or rather, last evening, and you found that the serial number upon the Mercoid pressure control was different than the serial number shown upon the shipping order which you had referred to in your direct examination, is that correct?

A. Yes. I made that check quite some time ago and didn't know—

Q. And said nothing about it when you were testifying about it on direct. Now, I ask you whether you made that check and you knew about the serial number of the control being different than the serial number which was on the control when you produced the shipping order, Mercoid Exhibit KKK for identification.

A. Yes, sir; I had reference to the type of control. My testimony, I believe, was directed to the type of control

designated on that purchase order as being the type 548 employed on that installation.

Q. Then I take it you never intended to convey the thought that we have here a circuit drawing and we have here shipping orders for controls, and we have here an installation, and that they were all equal for each other. You never intended to convey that on your direct examination?

A. As to the type of apparatus employed, that is, the controls, I did not intend to convey that the Figure 71, which was furnished Mr. Portner on that order, was the Figure 71 which formed a part of his installation. I had made a check, as I said previously, of that at another time as to the serial number. I do not believe there was anything directed to me on direct or cross examination as to whether or not the article forming a part of the installation was the article supplied Mr. Portner on that order.

Q. Do you recall referring to the Time-O-Stat Controls as the No. 35 in your direct testimony at one time?

A. The Time-O-Stat control shown in the photograph was identified in the drawing by the number 35, the same class of article.

Q. Now, what was the serial number upon the instrument known as Figure 71 on the Portner installation?

549 A. The serial number of the Figure 71 control forming a part of the Portner installation is 179825, and upon investigating the records of the Mercoid Corporation, that Figure 71 control was sold to Mr. Portner in October of 1928.

Q. And when did you investigate the Mercoid records as to the sale of that particular instrument to Portner in October of 1928?

A. I believe that occurred after our trip to Mr. Portner's establishment at the time the photographs were made. They are dated November 6, 1941.

Q. And what is meant by the number 845-237 found upon the shipping order in connection with Figure 21, or the room thermostat?

A. The numbers 845-237 represent a specification or code number identifying the elements forming that particular thermostat; that is to say, that number would define a Figure 21 thermostat having the double pole single circuit arrangement in it.

Q. And would that number appear upon the instrument itself?

A. No, sir. I checked into that upon noticing the number did not appear upon the instrument.

Q. That is, you found no such number upon the 550 instrument?

A. No, sir, there is none.

Q. Do you put any of these code numbers on instruments?

A. I don't recollect seeing that number on a room thermostat.

Q. Did your company put code numbers on instruments?

A. Yes, there are occasions where a particular modification of a standard control is given a number in addition to its type identification, in order to cover in the complete type number the special features incorporated in it. I have, in handling controls in which there has been a great variety of variations that could be made in the basic control, that is, the number of switches and the lengths of connections that could be made to it in arrangement of binding posts, and things of that kind, in the setting up of the specifications on that control which involved so many, hundreds of modifications in many instances, I have instructed in the entry of an order covering that special article to include as part of the type number a specification number covering that particular arrangement.

Q. And that code number or special arrangement identification is usually put upon the instrument itself, is it not?

A. Not in all instances.

551 Q. In some instances you do put code numbers on?

A. Yes. I might also make it clear, Mr. Freeman, that what I said occurs as my instructions will not date back to periods of 1929, or something of that sort. I have particular reference to some controls that Mercoid has developed, oh, particularly about 1935, pressure controls. And there are so many ramifications of circuits, temperature elements, and all that sort of thing, and with that particular line of control we have specifications covering the special construction to meet certain requirements.

Q. Do you know whether or not the Mercoid Corporation in the years 1928, 1929 and 1930 put code numbers on its instruments?

A. I believe that the sole mark of identification was strictly the type number, other than the serial number.

Q. And by checking back with the company records code numbers do disclose when controls were made and tested, do they not?

A. Oh, no, they wouldn't. The serial number would indicate the time of its manufacture.

Q. And by checking back on a serial number we can then know whether or not the control was or was not in existence at a given date, can we not?

A. Yes, sir, within a month or two, because orders for perhaps a stock order in the shop for five hundred instruments may be assigned the serial numbers and the full fabrication of the five hundred may take four to five weeks to complete.

552

Q. But controls never get out on the market without a serial number on them?

A. They are not supposed to, no.

Q. And did your company put any serial number on any of these special thermostats that were sold to Portner?

A. Perhaps I better make a point clear here, that in so far as 845-21 thermostats were concerned they were not manufactured upon the premises of the Federal Gauge Company in their completeness. They were completely manufactured by the American Radiator Company in Detroit. The recording of serial numbers and marks of identification would be made at that plant.

Q. Could you by checking the serial numbers determine when the control came on the market, that is, the particular control? I am not talking generally now.

A. Yes, I believe it should be possible. In connection with the Figure 21, it would necessitate contacting the American Radiator and having them go back in their records to check the date of manufacture of a thermostat bearing a particular serial number. I endeavored as far as the records of the Mercoid Corporation were concerned to ascertain by the serial numbers which appear on the Figure 21 thermostats when they were made, and in talking with parties who for,—well, 1929 or so,—have handled and disposed of stocks of thermostats coming into the Federal Gauge or Mercoid factory, they informed me that it was quite unlikely that I could even through Detroit at this date establish the date of manufacture of an article made in 1929. I didn't go any further than that.

553

Q. You did not take off any serial numbers—and when I use the term "take off" I mean write them down?

A. Yes.

Q. When you and Mr. McCabe visited the Portner place of business in April of 1940, did you?

A. I do not recollect doing so. The particular type of

thermostat Figure 21 more or less identified itself with that year.

Q. I am talking about any of the controls, those that you could check quickly with your own company records; did you then in April of 1940 make any effort to determine when a particular control was made?

A. No, sir, I did not.

Q. And have you at any time made any effort to check as to the time of manufacture of the three Time-O-Stat 554 controls which now appear upon the Portner installation, and which is illustrated in the four photographs MMM- to MMM-4, inclusive?

A. No, sir.

Q. Do you know whether or not there is a code marking upon each of those three Time-O-Stat controls which may throw some light as to when the controls were made?

A. None other than I noticed on the cover of the instrument the number. It is either 56—just a moment. I can't spot it on the diagram. It is in the fifty numbers. I believe it was 56.

Q. 56 was the type of control, was it not?

A. I don't know that. The number appears on the cover. That is the only numerical designation of any kind that I recognize now on the instrument as far as my investigations went.

Q. Did you take the cover off at any time?

A. No, sir.

Q. Then as a matter of fact, all you know about the Time-O-Stat controls on the Portner installation is the fact that the front of it says "Time-O-Stat Controls"?

A. That is all, yes, sir.

Q. Did you find in any of the controls which were examined last evening the letters and figures as follows: 555 B-30-LO?

A. I don't recall seeing those letters. As a matter of fact, I made no investigation at any time of the clamp-on controls other than to read what appeared on the cover.

Q. Did you find in any of the three Time-O-Stat controls any letters and figures as follows: A-30-LO?

A. If they appeared on the cover I probably saw them there. As I said, all that I ever saw was what appeared on the cover of the instrument.

Q. Did you find in any of the controls the letters and figures as follows: C-30-LO?

A. I don't recollect those markings.

Q. Now, do you know when the Time-O-Stat Controls Company started in business?

A. No, sir.

Q. And I take it that you have made no investigation as to when the company started in business?

A. No, I did not concern myself with the Time-O-Stat controls inasmuch as it was something not of Mercoid manufacture and I would have no way to investigate into matters relating to those controls.

Q. Did you look upon the name plates of the three Time-O-Stat controls to determine anything with respect as
556 to when the name plates were made?

A. No, sir.

Q. You were interested then, or, rather, satisfied with Mr. Portner's statement that the installation was put in prior to the time he opened his place of business in January or February of 1929; that is as far as you went with your investigation?

A. Yes, sir, that is correct, other than to identify the delivery to him of the Figure 71 control.

Q. And you had no personal knowledge of this installation, I take it, until April of 1940?

A. That is correct.

557 Q. Placing a limit control ahead of all other controls, in accordance with your understanding, might not necessarily mean placing the limit control ahead
558 of the fan switch?

A. No, sir, if there is a statement made as to where the fan switch should be connected.

Q. You put all of these letters yesterday in the same classification with respect to their teachings?

A. Yes, sir.

Q. And you exemplified such a teaching in Mercoid Exhibit QQQ with the dash line in blue, did you not?

A. Yes, sir, in combination with the red circuit.

Q. In combination with the red circuit?

A. Yes, sir.

Q. Now, could you take those letters and get any other combination than the one you told the court was contained in such letters, the one you have here shown in Exhibit QQQ?

A. I do not believe so.

Q. And you take the statement, when referring to a limit switch mounted in the drum of a furnace and connected in the line ahead of all other controls, to mean that you could

connect it in the line without regard to the furnace switch, is that correct?

A. The fan switch.

Q. Without regard to the fan switch?

A. Yes, sir.

559 Q. So that in so far as the terminology of the letters, wherein they state "ahead of all other controls," you now tell us that the limit control can be in the line with the fan switch either ahead of the limit control or back of the limit control, is that correct?

A. No, sir.

Q. You are telling us it can only be in a position where the limit control comes in the line after the furnace fan control?

A. As shown in Mercoid Exhibit QQQ. I don't want to involve this. I will limit it right there.

Q. In other words, the letters themselves when translated from words and put into a wiring diagram by some one of your ability and who understands controls and who understands electrical circuits, the letters all sum up into what we see in Exhibit QQQ in red and in the blue dash line, is that correct?

A. Yes. I don't know whether some exception might be taken to the fact that in QQQ, Mercoid exhibit of that designation, it happens that the room thermostat in this red circuit is ahead of the limit control. I don't know whether that would be a point of contention here or not. Will it, Mr. Freeman?

Q. No, it will not.

560 A. All right.

Q. So that with respect to the limit control, which is No. 24, you read all of those letters to mean what you show here in red, with the fan control—

A. Where it is.

Q. (Continuing.) —where it is?

A. Yes, sir.

Q. And that is the only way that you can read those letters?

A. That is the way I had to read them, as I analyzed them before I chose them.

Q. Yes.

A. To the best of my ability.

Q. With some fifteen or seventeen years of experience in working on controls and control drawings you gave us your interpretation of those letters?

A. What they convey to me, yes, sir.

Q. And with that seventeen years of practical experience in this particular field of endeavor?

A. Yes, sir.

Q. And the drawing that we have—keeping in mind now so I don't have to repeat, that we are talking about the limit control 24 and that portion of the fan circuit on the left hand side of Exhibit QQQ—means to you as we look at this drawing that the limit switch is ahead of all 561 of the other controls?

A. Yes. Now we are discussing that in connection with this Holland letter that you have read from.

Q. You put all of the letters in the same classification. I tried to do that in order to simplify my examination.

A. Yes, sir.

Q. And you went with me and said they were all the same?

A. Yes, but you have quoted from one particular letter that makes the statement of the limit control being ahead of all the other controls and the next paragraph defines in that particular letter something of the interpretation that should be placed upon the first paragraph as relating to the location of the limit control.

Q. Isn't that the sum and substance of the letter, taken in its entirety?

A. Yes, sir.

Q. The Holland Furnace letter?

A. Yes.

Q. Meaning what we have here, Exhibit QQQ?

A. Yes, sir.

Q. Now, I hand you a small pen and ink drawing, and I will give the court a rough copy of what the witness has.

A. I will give him my copy.

562 Q. I would like to have you examine that drawing and tell me whether or not it meets the terms and conditions of each of the several letters that you have referred to?

A. I don't believe that this meets what the letters cover as the arrangement of the fan and limit switch.

Q. Now, the limit switch in the sketch that I have given you, which we will mark for identification M H EXHIBIT 12, is ahead of all controls, is it not?

A. That is ahead—well, yes. I would like to be able to explain why I do not think that meets what the letters specify.

Q. That is the thing I am asking about.

A. Then may I have the letter you have in your hand, please?

Q. Well, take any one of the letters. They are all the same, as you said.

A. Here is the Peninsula, one of the earliest ones. In the Peninsula correspondence, the Federal Gauge letter of January 29, 1926, the recommendation in this letter is for the use of a fan control and a limit control.

As to the fan control it states it will cut in when the temperature in the dome reaches 200 degrees and remain in contact until the temperature has dropped to 140 degrees.

The limit control referred to in the second paragraph
563 serves as an instrument to prevent temperatures in excess of 300 degrees from being generated in the furnace, so it would function at 300 degrees to stop the burner.

Referring to the Peninsular letter of January 23, 1936, this statement appears:

"Please be advised that it is our intention to use this instrument in connection with a booster fan and its purpose is to start the fan after the fan has attained sufficient heat to prevent cold air being blown into the house and to stop the fan at such time, after the burner quits operating, that the temperature falls so low in the furnace that it is no longer desirable to have the fan running."

This quotation makes this positive statement, "to stop the fan at such time after the burner quits operating."

With a limit control in the burner circuit, the limit control could be the device that causes the burner to quit operating and this letter goes on to say that if that occurs and we stop the fan, after the burner quits operating, that the temperature falls so low in the furnace that it is no longer desirable to have the fan running. In other words, it is desired that the fan run after the burner quits operating.

In this sketch you have given me, if the burner quits
564 operating because the limit switch opens its circuits, it also opens the circuit to the fan, so we cannot run the fan after the burner quits operating, so it does not meet what the letter states was desired, as the function of the two instruments recommended by Mercoid would do.

565 Q. You can connect up the fan circuit so that it will be closed by the limit control or closed by the thermostat, is that correct?

A. Yes, sir, there is a disclosure of that there.

Q. And you can connect up the limit control in such a

manner as to permit the fan circuit to operate even though the room thermostat is in closed circuit position?

A. That is No. 2 arrangement, yes, sir.

Q. Now, in these letters reference is made that the fan will not start until the dome reaches a temperature of 190 degrees and will continue to run after the burner is off until the temperature in the dome drops to 140 degrees?

A. Yes, sir. That means that the limit control cannot interrupt that fan circuit, otherwise you do not get that operation. If the limit control goes off at 300 degrees and you want the fan to run until you drop to 140, when you put the fan switch in the limit control circuit, you stop the fan also at 300 degrees.

Q. It is not true that when these letters were written the reference that was made to the fans continuing to run after the burner stopped meant after the burner was stopped as the result of the thermostat opening and not the limit control?

566 Mr. Moore: I beg your pardon. I object to that line of questions, your Honor. This witness has just testified as to the contents of the letters and his interpretation of them. Now Mr. Freeman is asking questions that require the knowledge of the people who wrote those letters back in 1926.

The Court: I think it is proper cross-examination.

Mr. Freeman: I thought that that was what he was testifying to on his direct examination.

The Witness: I can answer that.

The Court: Overruled.

The Witness: If it please the reporter, may I have that question again?

(Mr. Freeman's last question was read as above recorded.)

The Witness: A. Well, the correspondence includes the recommendation for a limit control to prevent the burner from creating temperatures in excess of 300 degrees, so that when you view the correspondence, you view it in the light of the recommendation that was made. That is why it is put in here. And if the limit control was recommended to stop the burner, to prevent temperatures in excess of 300 degrees, you could not put that in a fan circuit and have the fan run after the burner quit operating, if

567 the room thermostat opened, it could likewise stop the burner and the fan would continue to run until the

temperature dropped in the furnace below the setting of 140 degrees.

Mr. Freeman: Q. And if, as you say, the limit switch did not interfere with the operation of the fan, would you ever get to a place where the temperature would drop to, say, 140 degrees where the furnace fan would move to open circuit position without regard to the position of the thermostat?

A. As expressed in these letters, yes.

Q. You would get to that position?

A. Oh, eventually, if you cut off the supply of heat, to stop the burner, and remained off a long while, your furnace temperature would drop.

Q. I asked you with respect to the limit control controlling the operation, would you ever get to 140 degrees if the thermostat did nothing?

A. Well, that all depends. We will keep to these figures. If the limit control were 250 to 300 degrees setting you naturally would not get down to 140.

Q. So that if you endeavor to accomplish just exactly what is said in these letters, then there would never be a shutting down brought about by the limit control that would still permit the fan to continue operating until 568 the temperature dropped to 140 degrees; I am correct in my statement, am I not?

A. That is correct, but I should like to add to it.

Q. You have answered my question, and you can tell about it when you are asked about it on redirect, please.

And the letters, taking the figures and recommendations contained in these several letters, talk about the fan starting after the dome reaches a temperature of 190 degrees, and the fan continuing to run after the burner is off until the temperature in the dome drops to 140. Now, that condition never should exist if the limit control does the controlling of the on and off of the burner motor?

A. Assuming there is no room thermostat in the circuit.

Q. Taking the letter as it is here?

A. That is what Mr. Freeman claims in his patent. You are right.

Q. As to the sequence of operation, referring to this particular letter here, these letters, and I am referring to them collectively, where Mercoid recommended the use of a limit control, and you are telling us now that you could not get a condition where with the control of the mechanism by a limit control you would ever get to 140

degrees where the fan would move to open circuit position?

569 A. If you take the instruments and set them at the temperatures we have been discussing, yes.

Q. I am setting these instruments at the temperatures recommended by Mercoid, and which are the figures you yourself used.

A. That is correct.

Q. I am taking you at your own figures.

A. I would like to say I don't know of any oil burner installations where you would not use a room thermostat. I don't know who would put an oil burner in a home, if it was not for the express purpose of heating the home, and to heat the home properly would necessitate the use of a room thermostat to be responsive to the temperatures in the rooms of the house.

Q. I am interested in getting what these letters say, Mr. Black.

A. That is right.

Q. Your interpretation of these letters.

A. That is right, Mr. Freeman, and we are placing an interpretation on the letters.

Q. With the knowledge of the Freeman patent before you?

A. No. The Freeman patent claims must have placed upon them an interpretation. Now, the Freeman patent claims of group 1 exclude the room thermostat. We

570 are now treating this correspondence as excluding the room thermostat, and even so, excluding it, the claims define what the letters—excluding the thermostat—disclose.

Q. Now, if you exclude the thermostat, and I will take you at your own statement now, would you ever get to a place where the fan switch would ever move to open circuit position, that is, drop to 140 at any time?

A. In connection with what?

Q. Taking your example, where you exclude the thermostat as you use only a limit switch set at the figures which you yourself referred to, and which figures are found in the several letters we are now talking about, would you ever get into a condition where the fan switch would move to open circuit position, and you can answer that yes or no.

A. No.

Q. So that you, taking your own position, where you say only a limit switch does the job and that is all that is

referred to in these letters, you never could get to a position where the furnace would get at a temperature low enough, that is 140 degrees, where the fan switch would then move to open circuit position?

A. No, sir; neither would you in the Freeman arrangement, excluding the thermostat and operating the two
571 controls at the same temperatures.

Q. So that you are now including a thermostat into the operation?

A. I am not. You are making these assumptions, Mr. Freeman. I am trying to answer your questions, and am doing it in the light of the circumstances which you create.

Q. I don't want to quibble with you. I am merely taking your own statement as to the fact that you exclude the thermostat and use only the limit switch. Now, are you telling me that the thermostat is an essential portion of the device in order to get this sequence of operation?

A. At those figures, yes, sir.

Q. Then, so far as the control of the fan switch circuit, you never would get to a condition where the fan would continue to run until the temperature dropped to 140 degrees, unless in the meantime the thermostat has moved to open circuit position, that is correct, is it not?

A. Yes, sir.

Q. Does Mercoid put out any installations where the limit switch of itself controls the operation of the fan coming on and going off?

A. Relating only to the fan?

Q. Yes.

572 A. I believe there is some in evidence.

Q. Will you give me that?

A. No, I believe I am wrong, Mr. Freeman. I had in mind a bulletin which carried the title Mercoid M-53 Warm Air Furnace Fan Control. I thought that related solely to the use of a furnace fan, but forming also part of this is a short description showing other devices which may be used in warm air heating systems.

Q. Now, let us take a look at M-H Exhibit No. 12. The limit switch is there connected in the line ahead of all other controls, is it not?

A. Yes, sir.

Q. And let's take the condition that the limit switch is set with your standard range, cuts in at 250 and cuts out at 300, and let's take the furnace fan control so as to cut in at 190 and cut out at 140, and with the arrangement that

you have here in M-H Exhibit 12 you can have the fan running even though the thermostat has shut down the burner?

A. The room thermostat?

Q. Yes, sir.

A. Yes, sir.

Q. So that we have in M-H Exhibit 12 a diagram or hook-up for a room thermostat and limit switch and a
573 fan control, wherein the fan will not start until the dome reaches a temperature of 190 degrees, and will continue to run after the burner is off, until the temperature in the dome drops to 140 degrees, thus using the latent heat of the furnace, is that correct?

A. Yes, sir.

Q. So that the figures used in these letters as to the cut-in and cut-out point of the limit switch, as well as the fan switch, will bring about a sequence of operation as specified or illustrated in the hook-up, Exhibit M-H 12? ?

A. Not completely; only as regards the action of the room thermostat. It does not include the operation of a fan as a result of action of the limit switch such as expressed in the letter.

Q. Well, as a matter of fact, the fan control never can get down to 140 degrees, where it will open up, unless the room thermostat functions?

A. If the setting is 250 to 300 degrees, yes, sir.

Q. I am reading this letter, Mr. Black, and I am taking all these letters at the figures therein specified and recommended by Mercoid Corporation. I am not trying to re-engineer what was found in these letters, and if you will please refrain from taking different temperatures.
574 I am taking the temperatures that are found in these letters and which you referred to in your direct examination.

A. I am just making sure.

Q. I am now asking you whether or not the drawing that you have in your hand does not in its entirety meet the explanation contained in these letters, and by way of example, I will refer to the letter dated September 14, 1928, written by The Mercoid Corporation to the XXth Century Heating & Ventilating Company. I am using that letter merely as illustrating by way of example, and not by way of limitation. Right?

A. I can't agree with you, Mr. Freeman. I should just be repeating what I said five or six minutes ago—the limit

control stops the burner in this arrangement and we also stop the fan.

Q. Is there anything in this letter that tells you the limit switch does not stop the fan, and point it out specifically, and I am again handing you that letter as illustrative of the group of letters?

A. Yes.

Q. Will you read it?

A. I will read the whole paragraph in its entirety.

Q. No. Read that portion that has to do with the 575 limit switch stopping the fan.

A. There are two statements that bring that out. The first statement relates to the fan and it says, "It will continue to run after the burner is off until the temperature in the dome drops to 140 degrees."

Q. Will you stop now and tell me whether or not the burner will remain off until the temperature drops to 140 degrees, if the burner is controlled by the limit switch; will you ever get such a condition?

A. We have been linking this correspondence up with M-H Exhibit No. 12, and as portrayed in that exhibit, my answer is yes, because this includes the room thermostat which might shut down the burner.

Q. You are now talking about Minneapolis-Honeywell Exhibit 12, and I agree with you, but I am asking you where in any of these letters do you find a reference that enables you to say that the limit switch does the turning off of the burner and still permitting the furnace fan to keep running until the heat of the furnace itself has dropped to 140 degrees?

A. As to the fan, I just read this, "will continue to run after the burner is off until the temperature in the dome drops to 140 degrees, thus using the latent heat of the furnace."

576 Q. All right, Mr. Black.

A. That is one thing. And it says this control would be connected in series with the line and fan motors. I thought we were going into this correspondence as a result of your asking me questions about M-H Exhibit 12.

577 Q. Now, Mr. Black, reading the letter as you have now read it, you agree with me that when the furnace is at a temperature higher than 300 degrees the limit switch will open and the burner will go off?

A. Yes.

Q. Yes; and the fan will continue to operate, or not?

A. It will operate, yes.

Q. All right. That is what you say.

A. Well, the fan closes at 190 degrees, so at 300 degrees the fan switch would be closed, of course, and the fan would be running.

Q. What is meant by latter control, which is the fan control would be connected in series with the line and fan motors? What is meant by "in series"?

A. That would be the one wire would be taken off one side the line and run through the control, the fan motor, and back to the other side of the line. That would be a series.

Q. Is that what you call a series?

A. A sequence of or a succession of articles or devices or apparatus through which the circuit flows first to one and then the other.

Q. But you have been careful not to put the limit control in series with your fan control in your explana-
578 tion, is that correct?

A. This letter says you are going to remove the latent heat of the furnace after the burner quits operating, and you could not do that if you put it in the limit control circuit, it would be just contrary to what the letter says will be accomplished.

Q. All right. Now, so long as the limit control controls the furnace it opens its circuit at 300, does it not?

A. Yes.

Q. And it again closes its circuit and re-establishes the burner operation at 250, is that correct?

A. Yes.

Q. So that the burner would operate to produce heat until the heat reached 300 degrees and then the burner would go off? Correct?

A. Yes.

Q. And the burner would come back on at 250, would it not?

A. Yes.

Q. And that would keep on for ever and a day in the absence of something else, is that correct?

A. Yes, and that brings now more or less to me something rather odd.

Q. Will you answer my question, please? I am
579 trying to get the sequence of operation here.

A. All right.

Q. And you have agreed with me that the oil burner

will go on and off, that is, off at 300 and back on at 250? Correct?

A. That is right. There would be no need for fan control under those conditions.

Q. I am taking the conditions as specified in the first paragraph of this particular letter, the XXth Century letter. That is the operation, is it not, of the oil burner as controlled by the limit control? Correct?

A. Yes, sir.

Q. Now, you agree with me that the fan cuts out at 140 degrees? Correct?

A. Yes.

Q. As specified in the letter of the XXth Century Company?

A. Yes.

Q. Will there ever be a condition where the furnace would drop to 140 degree temperature so that the fan switch might then be moved to open circuit position?

A. No. If we had that operation we would not even need the fan switch.

Q. So the thermostat does the same job?

580 A. Yes.

Q. So that in M-H Exhibit 12 we have a condition where so long as the limit switch remains in open circuit position nothing will operate?

A. Yes, sir.

Q. And we have in M-H Exhibit 12 a situation where both the room thermostat and the limit switch control the operation of the burner?

A. Yes, sir.

Q. And we have in Exhibit M-H 12 a situation where the fan can run independently of the room thermostat being either open or closed, is that correct?

A. Yes, sir.

Q. But the fan in M-H Exhibit 12 cannot run if the limit switch moves to open circuit position?

A. Yes, sir.

Q. And in M-H Exhibit 12, which differs from your Exhibit QQQ, you have a limit control in the line ahead of all other controls, do you not?

A. Yes, sir.

Q. And you also have in Exhibit M-H 12 the situation where the fan will not start until the dome reaches a temperature of 190 degrees, is that correct?

A. Yes, sir.

581 Q. And you likewise have in M-H 12 a situation where the fan will continue to run after the burner is off until the temperature in the dome drops to 140 degrees?

A. That all depends.

Q. No. Will you tell me whether or not that is a condition in the M-H 12, that is, where the fan will continue to run after the burner is off until the temperature of the dome drops to 140 degrees?

A. Yes or no. Under one condition it is true. Under another condition, no. And I say if the burner quits operating because the room thermostat opens the burner circuit and stops it, yes. If the burner quits operating because the limit switch opens this circuit and stops, the answer is no.

Q. Is there anything at all in this letter that tells you that the burner must stop as a result of the limit switch moving to open circuit position?

A. The letter states the fan runs after the burner quits operating.

Q. You are assuming the fan runs after the burner stops, whether the burner is stopped as a result of the limit switch or whether the burner is stopped as a result of the room thermostat moving to open circuit position; that is an assumption of yours, is it not?

582 A. No, if the limit control stops the burner the fan is supposed to run in this arrangement.

Q. But it doesn't so state, does it, in this letter?

A. The limit control is in the burner circuit, and I don't care whether the temperature ever goes down to 140, if we want to take that position, the letter states the fan runs after the burner quits operating. If the limit switch is the cause of the burner stopping, the letter says, nevertheless, when you quit operation of the burner it should be possible for the fan to continue to run, whether it gets down to 140 degrees, I don't know, but the letter specifically states it must run after the burner stops. You can't do that here if the limit control stops the burner.

Q. But you can meet everything in this letter with the limit switch closed and the room thermostat open? I am referring now to M-H 12.

A. Yes; if the limit switch remains closed and the room thermostat stops the burner, then, you will remove the latent heat of the furnace.

Q. Until the temperature drops to 140 degrees, at which

time the fan switch will then move to open circuit position?

A. Yes, sir. I made that statement in my "yes" part of that answer a few minutes ago.

583 Q. There is no question, is there, in this circuit drawing that we have here, Exhibit M-H 12, that the limit switch is in the burner circuit?

A. The first part of that question, please?

(The question was read by the reporter as above recorded.)

A. No; the limit switch is in the burner circuit.

584 Mr. Freeman: I want to offer in evidence as M-H EXHIBIT 12 the sketch or drawing referred to by the witness in connection with the letters or, rather, group of letters exemplified by Mercoid Exhibit GGG, the XXth Century Heating and Ventilating Company correspondence.

(The document was so marked.)

FRANK R. BLACK, a witness called on behalf of the complainant, having been heretofore duly sworn, resumed the stand and testified further as follows:

585 Q. Mr. Black, do you find any limit control in the Johnson patent No. 360,223?

A. No, sir.

Q. And in Kilbourn patent No. 479,761 there is no forced means for circulating the heating medium from the place of combustion to the rooms to be heated, is that correct?

A. There is no forced circulating means of that kind.

Q. And there is no circulating fan?

A. No, sir.

Q. And there is no control, therefore, for controlling any fan mechanism?

A. That is right.

Q. There is lacking in Kilbourn any means for getting rid of the excessive heat from the place where it is created and delivering it into the rooms to be heated, that is correct, is it not?

A. That is correct.

Q. And Kilbourn does not provide any of the sequence of operation that we have been talking about in connection with Freeman?

A. Where it involves a circulating fan, no. I will
586 limit it. Kilbourn just shows the use of a limit control to check combustion or permit to be accelerated.

Q. And that is all?

A. Yes, sir.

The Court: What was the first one?

Mr. Freeman: The first one was Johnson No. 360,223.

The Court: Read me those questions and answers, will you please?

(Record read by the reporter as above recorded.)

The Court: What was that about the limit control in Kilbourn?

The Witness: Do you want my answer read or shall I give it to you again?

The Court: Give it to me.

The Witness: The limit control operates to check combustion or permit it to be accelerated.

The Court: All right, go ahead.

Mr. Freeman: Q. Turning now to Kunt patent No. 1,193,271, you do not find in Kuntz, do you, any fan switch or control which is dependent upon furnace temperatures, do you.

A. No, sir.

Q. And in Kuntz the room thermostat controls both 587 the fan motor and the damper motor, is that correct?

A. Yes, sir.

Q. So that when the damper is open or draft created, the fan is on?

A. Yes, sir.

Q. And when the damper is closed the fan is off?

A. Yes, sir.

Q. And if the room thermostat continued to call for heat upon some abnormal condition what will then happen with respect to the operation of the furnace?

A. The furnace will continue to generate heat, to deliver it to the room to satisfy the thermostat, with the fan in operation taking it to the room.

Q. And that would keep right on going, wouldn't it?

A. Yes. There would be combustion continued and circulation of the air.

Q. No protection at all against excessive heating conditions?

A. No limit controls, no, sir.

Q. And that means no protection against excessive heating conditions, so that if the room thermostat demanded heat the furnace would keep right on going for ever, until the thermostat moved to closed circuit position or was satisfied?

588 A. You would have such protection as would result from the fan continuing in operation removing that heat, no matter what temperature it attained. Now, whether the fan would remove it at a degree sufficient to prevent real over-excessive conditions might be a factor in there, but, as the Freeman patent says, the fan 21 thus serves to assist in the cooling of the furnace when the fire has been checked because of overheating.

We are creating in the furnace there a high temperature condition and at the same time having the fan operating to remove the hot air we would have to some degree, which might be questioned as to how much—we would have to some degree, through the operation of the fan, means to remove that hot air, tending to relieve a dangerous condition in the furnace.

Q. You are assuming now that the fan will eliminate part of the hazard if you get rid of some of the heat, is that right?

A. Yes, it would be running.

Q. But you do know the furnace is operating when the fan is also operating, but, notwithstanding simultaneous operation of both the furnace and the fan, the furnace still gets too hot; that is the condition, is it not?

A. It may, yes.

589 Q. Well, that is a condition that happens with the use of even your M-80 control, is it not?

A. That is what the M-80 control is intended to do, where the furnace might be of a construction where with the fan running you could nevertheless create a high temperature condition. I say that, Mr. Freeman, because I referred to the Cross patent at one time—

Q. No, let us just stick to this one.

A. I just want to qualify why I cannot say one hundred per cent one way, that is all.

Q. Go ahead.

A. I said the M-80 does it because it could be applied to a furnace where with the fan running you could nevertheless in that furnace construction attain a high undesirable temperature.

Q. And that temperature would keep building up, because the fan—

A. Could not carry it away fast enough.

Q. (Continuing)—could not carry it away fast enough?

A. That is right; and if I may be permitted, please, why I say I cannot make it a hundred per cent, Cross stated

that he so constructed in his invention his furnace that he believed that his particular construction with his operating apparatus prevented the attainment of tempera-
590 tures up to the kindling point of wood, so possibly if Mr. Cross is right, that that construction of a furnace would prevent that, then of course the operation of a circulating fan with that particular furnace construction, would not need the overheat limit control.

Q. With the fan, using your temperatures, operating at a 250 degree temperature, you would then have the burner operating at the same time, wouldn't you?

A. Yes, sir. You are referring to Kuntz here?

Q. Well—

A. Or anyone?

Q. Using your figures as the desired temperature operation, in order to get successful heating in the house?

A. Yes.

Q. You would have both the fan and the limit switch on when the temperature was 250 degrees in your job?

A. For the M-80 you might say or the M-51 or M-53, yes.

Q. And notwithstanding the furnace fan being on, you might still get to a temperature of 300 degrees, is that correct?

A. Yes, sir.

Q. Which means that the fan is not taking away the heat as fast as it is produced, is that correct?

591 A. That is correct.

Q. Now, if you can go from 250 to 300 with the fan on and you had no limit control or no protective device, might you not keep right on going with the fan operating until you reached a temperature of, say, 325 degrees?

A. Yes. That was disclosed, Mr. Freeman, in the letters relating to those temperatures. We explained that at 340 degrees you approached a condition in the furnace where you might set fire to lint and dust or accumulation of dust. You are right there.

Q. So with the fan only and no protective device, you might run it to 340 degrees, where you would then set fire to the lint, as referred to in the Mercoid correspondence with some of its prospective customers?

A. That is a possibility, yes, sir.

Q. And that is why it is desirable to terminate operation of combustion or the heat producing means at a time when the temperature of the furnace in the basement is low

enough so as to be sure that you will not start a fire in the ducts of the furnace?

A. Yes, that would be desirable.

Q. And in the Kuntz patent, with no such protective device, even though there is a fan, you could attain a temperature of 340 degrees or upwards, could you not?

592 A. I should say that would be possible.

Q. And thus it would provide a hazardous condition, using your own figures, at the time when a hazard takes place?

A. Yes, sir.

Q. You know, as a matter of fact now, do you not, that even 300 degrees in some cities is too high a limit?

A. Yes, sir.

Q. And you know that in connection with certain gas installations the top limit or the safety factor is as low as 250 degrees, do you not?

A. Yes. That varies in accordance with the construction of the furnace. The furnace is tested and a limitation placed on the amount of heat which may be permissible in that furnace before it carries the approval, we might say, of the American Gas Association.

Q. That is what I was going to refer to, the A.G.A.

A. Yes.

Q. The American Gas Association.

A. Yes.

Q. Their limit is 250, is it not?

A. Well, with one man's furnace it may be 250, with another man's furnace they may place a somewhat

593 lower limit, 225, perhaps. They test the construction of the furnace to determine what is a safe maximum temperature to create in the furnace. One man constructs his furnace one way and another another.

Q. And certain city ordinances now provide for temperatures lower than 300?

A. Yes, sir, there are ordinances to that effect also.

Q. Three hundred is about the top limit with any degree of safety, am I correct?

A. I should say so, yes.

Q. So that if you provided no means for terminating operation at around 300 degrees, you would then get into that realm—

A. Or possibility.

Q. (Continuing.) —or possibility of fire hazard?

A. I should say so.

Q. Will you now turn to Johnson patent No. 1,602,363? Do you find anything in Johnson No. 1,602,363 that starts a fan operating when the temperature of the heating plant attains a temperature of 140 degrees?

A. No, sir, I do not.

Q. You find no means for providing forced heat-carrying means for delivering the heat of the burner or combustion member, delivering it to the place where it is to
594 be used?

A. I do not.

Q. You find no such fan circulating means?

A. No, sir.

Q. And therefore you find no control that is responsive to furnace temperature for controlling any delivery means?

A. I do not.

Q. So that we know what the Johnson discloses, you agree with me that there is provided a limit control in Johnson, which is in series with a thermostat, so that if either the thermostat or limit switch operates, the burner stops?

A. That is correct.

Q. And with that explanation—

A. To operate means to open the circuit of either one.

Q. That is correct.

A. Yes, sir.

Q. My explanation, with which you agreed, is a fair explanation of the Johnson patent, is it not?

A. Yes, sir.

Q. Will you now turn to Teal? It can be summed up as doing about the same thing that the Johnson patent No. 1,602,363 does; that is, the patent that we last considered?

A. That is right. The difference being that one
595 controls combustion by damper controller and the other by an oil burner, and Teal in particular shows a warm air furnace, although he says that what he discloses may be "equally applicable to hot water and steam."

The Court: What is this Teal? What do you say Teal is?

The Witness: Teal is like Johnson No.—

Mr. Freeman: 1,602,363.

The Court: You have a room thermostat and a limit switch?

The Witness: Yes.

Mr. Freeman: I just thought I could save a little time, your Honor.

The Court: That is all right. I was just looking for my notes.

Mr. Freeman: Q. Mr. Black, there was a catalog of the Time-O-Stat Controls Company referred to yesterday by Mr. Portner and I am wondering if you made any comparison of the number 56 aquaswitch which is illustrated in the catalog on page O-26 with the aquaswitch or any one of the three aquaswitches on the Portner installation?

A. Only to the extent that as to the Portner instal-
596 lation I viewed the aquastat where I stood on the floor. I did not get up on a ladder to make a close inspection of it.

Q. There were three aquaswitches on the job. One of them was relatively—

A. You are right.

Q. (Continuing.) —easy to see?

A. Yes, sir. I looked at that, and did so last night.

Q. Last night?

A. Or—

Q. The night before last?

A. When Mr. Fisher was out there that day. I made not a close inspection of it. I might say I limited my inspection to just the cover when it was removed from the instrument.

Q. I was in hopes you could tell us that the aquaswitch, at least from outward appearance, particularly the name plate which appears on the physical model of the Portner installation, is as disclosed in the catalog which you produced or, rather, Mercoid produced?

A. The catalog illustrates an article much as it appears to me where it forms a part of the Portner installation, and the identification that I would associate with the two
597 are the words "Time-O-Stat" and "Elkhart, Indiana."

Q. So that the catalog which I thought was produced to show what is out at the Portner installation does, from outward appearance, correctly portray the instrument at the Portner installation, is that correct?

A. It appears to me to be the same, yes, sir.

Q. And you checked, or, rather, compared the physical device at Portner with the name plate, so that generally speaking the name plate that is illustrated in the catalog on page O-26 in Mercoid Exhibit RRR is the same as in the Portner installation?

A. I am not going to say it is exactly the same, because I made no close scrutiny of all of the details on the article.

However, the words "Time-O-Stat" and "Elkhart, Indiana," appear in this illustration upon the cover and it did so appear on the cover of the instrument I looked at in the Portner installation. As to the outward appearance, they appear to me to be the same devices.

My interest, I might say, was as to the function of the article. I know what those things are supposed to do, articles of that type, and when I saw one mounted on the pipe of the heating plant, it served the function that it was
598 intended to serve. As to the mechanical details and all that, I did not look within the casing to find out what it was.

Mr. Freeman: Mr. Moore, I presume it will be agreeable if we send some one out to the Portner installation at Wheaton, Illinois, and compare one of the devices, at least the name plate portion, with this catalog, so that we can get a clear statement here that the catalog does disclose what is in the physical device. I am referring now only to the cover of the instrument. Or if we have one of the instruments, at least the cover brought in here, that will satisfy.

Mr. Moore: There is no objection to that. I suggest possibly having a photograph made and having it enlarged, and then it will show all of the details on it. There is one of those aquaswitches down low, in a good light.

Mr. Freeman: I am thinking of time, primarily.

The Witness: If I might make a suggestion, we might contact Mr. Portner, if that would be agreeable, and perhaps he could arrange to have somebody bring in the covers on the three instruments.

Mr. Moore: The only thing is, I don't like to interrupt Mr. Portner's business, because he is all by himself there, and he is pressed pretty hard. He has gotten a job,
599 he says, which will take him three days. I have no objection to bringing that in.

Mr. Freeman: If you tell me we can send some one out there to take a look at the installation, referring only to this particular Time-O-Stats control, that will be agreeable. Frankly, I am sending a man out who knows something about that particular instrument, who was with the Time-O-Stat Controls Company and can identify it.

Mr. Moore: There will be no objection at all. The only reason this was introduced was that Mr. Portner had been referring to aquaswitches or, rather, aquastats and I asked him if this is what he meant by that term.

Mr. Freeman: That is all.

I might say, your Honor, we are going to have some one go out there, in addition to taking a photograph of the instrument, and have a chance to see the physical instrument. The men who were out there yesterday were not connected with the Time-O-Stat Controls Company.

Mr. Moore: There will be no redirect.

(Witness excused.)

Mr. Moore: May it please the court, I would like to
600 offer in evidence photostatic copies of the bills produced by Mr. Portner yesterday, as follows:

Chicago Steel Tank Company, dated 11/26/28;

McMaster-Carr Supply Company, dated 11/28/28;

Electrol, Inc., dated 12/18/28;

Another McMaster-Carr Supply Company bill, dated 12/19/28;

Graybar Electric Company, dated 12/31/28;

Bell & Gossett, dated 1/9/29;

Two freight bills dated December 20, 1928, and January 5, 1929;

As MERCOID EXHIBIT TTT, and substitute photostats for the originals.

(The exhibit was so marked.)

601 L. Kerans Moore: If your Honor please, I will call Mr. Brodersen.

PAUL BRODERSEN was called as a witness on behalf of the complainant, and after having been first duly sworn, testified as follows:

Direct Examination by L. Kerans Moore.

Q. Please state your name, age and address?

A. Paul Brodersen, thirty-two years old; 376 Fairview Avenue, Elmhurst, Illinois.

The Court: What is your name?

The Witness: Paul Brodersen, B-r-o-d-e-r-s-e-n.

L. Kerans Moore: Will you speak a little louder, Mr. Brodersen?

The Court: Go ahead.

The Witness: A. 376 Fairview Avenue, Elmhurst, Illinois.

L. Kerans Moore: Q. And what is your occupation?

A. Commercial photographer.

Q. I show you four photographs marked for identification as Mercoid Exhibits MMM-1, 2, 3 and 4, respectively, all bearing the legend, "Establishment of J. A. Portner, 225 West Front Street, Wheaton, Illinois, November 6, 1941," and ask you if you can identify those photographs?

602 A. Yes, I can. I took these photographs.

Q. How did it happen you took those pictures?

A. Mr. Black of the Mercoid Corporation called for me in the morning to take me out to Mr. Portner's establishment to take these photographs.

Q. Was anyone present when you took the photographs?

A. Yes, Mr. Langdon Moore, Mr. Frank Black, and Mr. Portner.

Q. Is it your custom to mark all the picture that you take with the name of the establishment, the address and the date?

A. No, it is not. Mr. Moore asked me to mark them.

Q. What does the date on those pictures, November 6, 1941, indicate?

A. That is the date I took those photographs, these photographs here.

Q. Whose writing is that on those pictures?

A. That is mine.

Q. I note that three of these photographs are numbered, 1, 2 and 3, and the fourth is unnumbered. Did you place those numbers on there?

A. Yes, I did.

Q. Why did you do that?

603 A. Mr. Moore asked me to after I had already printed one set with the legend on, of these photographs

Q. And did you forget to put No. 4 on the fourth one?

A. Yes, I did.

L. Kerans Moore: I offer in evidence, your Honor, these four photographs, as MERCOID EXHIBITS MMM-1, MMM-2, MMM-3 and MMM-4, respectively, and ask that they be received.

The Court: They may be received.

(The photographs were so marked.)

L. Kerans Moore: Direct examination closed.

Mr. Freeman: No cross-examination.

(Witness excused.)

604 J. A. PORTNER was called as a witness on behalf of the complainant, and having been first duly sworn, testified as follows:

Direct Examination by Mr. Moore.

Q. Will you please state your name?
A. J. A. Portner.
Q. Your age?
A. Fifty-three.
Q. Residence?
A. 901 North Wheaton Avenue, Wheaton, Illinois.
Q. And what is your occupation?
A. I sell and install and service heating equipment and accessories, refrigeration and air conditioning equipment and accessories, electrical equipment and home appliances.
Q. How long have you been in that business?
A. Thirty-one years, the 5th of this coming April.
Q. Do you have a place of business in Wheaton?
A. Yes, sir.
Q. And where is it at the present time?
605 A. 225 West Front Street, Wheaton.
Q. How long have you been in that present address?
A. Since January, 1929.
Q. Now, what kind of heating equipment do you refer to that you installed and serviced?
A. Well, we install complete heating plants, including hot water, steam or warm air, either hand fired or automatically fired, by either gas, stokers or oil burners.
Q. And did you handle that kind of equipment before you moved into your present place of business in 1929?
A. Yes, sir, with the exception of automatic gas and stoker heating.
Q. Is there any difference between the term "boiler" and "furnace" as used in the trade?
A. Yes, sir.
Q. What is it?
A. A boiler is always used and associated with either steam or hot water heating, where a furnace is used for direct warm air heating.
Q. Now, when you install an oil burner, you refer to it as an automatic heating system, do you not?
A. Yes, generally so.

Q. What makes the oil burner operate; what starts it and stops it, ordinarily?

606 A. Why, its controls, primarily the thermostat.

Q. And where is the room thermostat located?

A. It is located in the room to be heated.

Q. Do you use any other controls besides the room thermostat in an oil burner?

A. Yes, numerous controls.

Q. What are they?

A. The minimum controls to be used in a safe oil burner installation would consist of your thermostat, the limit-stat, limit control and the safety controls associated with the burners themselves.

Q. If you had an oil burner installed in a warm air heating furnace, where would this limit control that you referred to be located?

A. Usually in the bonnet or plenum chamber above the furnace.

Q. What is the purpose of this limit control being placed in the chamber of the furnace?

A. To prevent excessive or dangerous temperatures being reached by the furnace.

Q. Do you have similar controls if you use a steam system or hot water system?

A. Yes, similar.

Q. What are they called?

607 A. Well, aquastats in the case of the hot water boiler and a steam pressure limit control or pressurestat associated with the steam boiler.

Q. And what is this aquastat that you refer to?

A. The aquastat is an instrument located on the boiler or immersed in the water of the boiler or probably clamped to the risers or leads from the boiler on a hot water plant which is actuated by the temperature of the water in the boiler.

Q. And what kind of a limit control, if any, do you use in connection with a steam heating system?

A. We use a pressurestat or pressure limit control, which prevents excessive pressures or dangerous pressures and is actuated by the steam pressure of the boiler.

Q. Do you ever use any controls clamped on the pipes?

A. Yes, sir.

Q. Of the heating system?

A. Yes, sir.

Q. What are they called; what do you generally refer to them as?

A. I still refer to them as aquastats. Different manufacturers have different trade names for them.

Q. Before you moved into your present place of business in 1929, did you act as a dealer for any oil burner 608 control manufacturer?

A. Yes, sir.

Q. Who did you act as a dealer for?

A. Well, in burners we were dealers for Electrol, Cleveland Steel Products, Northern Machinery Company, and for controls we acted as dealers for Mercoid. We also stocked some controls of other makes. I suppose we would be presumed to be dealers in the ones we carried stock on and handled and sold.

Q. What other makes of controls did you handle before you moved into your new place of business in 1929?

A. Well, Con-Tac-Tor, Time-O-Stat, Minneapolis-Honeywell and Mercoid.

Q. Didn't the manufacturer of the oil burner furnish controls with the oil burners?

A. Well, he did in some cases. In some cases it was mandatory. In other case it was optional.

Q. Did the oil burner manufacturers, as a rule, when they furnished the control, send a wiring diagram along with them to show how the controls were to be hooked up?

A. They either sent it along with them or it was in their instruction manuals.

Q. How about these controls that you bought from these various control manufacturers, did they also furnish 609 wiring diagrams; that is, before 1929?

A. Why, yes, some diagrams in some cases but not in all cases.

Q. You say you installed and serviced these different heating systems. How did you solicit that business?

A. Well, we had to go out and ask for it, mostly, in those days.

Q. This is before 1929?

A. Yes, sir; I assume you are speaking about prior to that.

Q. And when you got a job to install an oil burner or service heating system, what was the first thing you did?

A. We would survey the premises and familiarize ourselves with the requirements and the needs.

Q. If you were going to install an oil burner, you surveyed the premises, you found out what the needs were, then what did you do?

A. Then we would check and see what equipment was available to serve that need and get satisfactory and proper results.

Q. And would you study wiring diagrams that were submitted by the oil burner manufacturer or control manufacturer?

A. Why, I usually paid little attention to them. I usually worked out my own.

610 If you had a special problem the chances are you would not find that disclosed in any of these diagrams furnished you, would you?

A. No, sir.

Q. So you say you had to make out your own wiring diagrams?

A. Yes, sir, in most cases.

611 Were you always able to meet these various problems yourself that you met in making installation of an oil burner or coal stoker?

A. Yes, sir.

Q. Can you state before you moved into your new place of business in 1929 one instance of a problem that you had to solve in the heating system that was not explained in any wiring diagrams from the oil burner manufacturer or control manufacturers?

A. Well, I have one especially in mind, and if I remember correctly, around in 1925, which is known as the low limit control on hot water boiler which we used for several years before I ever saw anyone have any wiring diagram on it at all, whereby we attached an aquastat to the boiler to prevent the boiler from becoming cold or dropping below a predetermined temperature so as to maintain a more even heating temperature in a house, due to the lag between the time the thermostat closed and called for heat until the burner was delivering heat to the room.

Q. And you made that hookup yourself without any further instructions?

A. Yes, sir.

Q. And who made this aquastat you speak about?

612 Do you remember?

A. I know of two cases where we used a Time-O-Stat. I am not so sure of what we used on some of the others. We may have used any one of several makes.

Q. Who makes the aquastat?

A. That is what I am talking about,—Time-O-Stat.

Q. Who is the manufacturer of it, do you remember?

A. I don't know who made the Time-O-Stat.

Q. No. I asked you about the aquastat. Do you know which control company sold the aquastat?

A. I can't remember.

Q. You just gave the term aquastat as a definition of controls of that character, is that right?

A. That is right.

Q. Have you been called to service or repair jobs that have been put in by other men?

A. Many times.

Q. And did you find those jobs had been installed in accordance with the wiring diagrams furnished by the burner manufacturer or the control manufacturers?

A. In most cases—

Mr. Freeman: What job are you talking about now?

Mr. Moore: Read the question and answer before this last question and answer.

471 (The record was read by the reporter as above recorded.)

Mr. Moore: On any one of them.

Mr. Freeman: I would still like to know what job you are referring to, steam installations, furnace installations, oil burner installations, stoker installations I would like to know, so if we do cross examine this witness at least we will be talking about something definite.

Mr. Moore: He has already stated, your Honor, he has put in heating systems for hot air.

Mr. Freeman: All right. We will cross examine him at length on all heating systems.

Mr. Moore: Well, if you want to suggest the questions now I will be glad for him to answer them.

Mr. Freeman: Talk about some specific job when you get back to 1929, if that is what you want. I don't want to tell you how to handle your witnesses.

Mr. Moore: I think we had better let Mr. Portner go along as he now is going.

Now, what was the question.

(The question was read by the reporter as above recorded.)

Mr. Freeman: That is objected to as immaterial.

472 The Court: I think it is. I can't see what bearing it has except mere background. It is rather obscure background.

Mr. Moore: That is all, your Honor.

The Court: What is that?

Mr. Moore: That is all, just to make a background showing this man since 1923 has been dealing with these things as his bread and butter and knows them. That is all.

The Court: That doesn't make any difference. Let him answer. Go ahead.

Mr. Moore: Q. Go ahead and answer it.

A. I have forgotten what the question. Will you read the question?

(The question was again read by the reporter as above recorded.)

A. In most cases, yes.

The Court: Q. How did you know that?

A. Because we had their wiring diagrams usually in our files. In other words, they were connected according to the orthodox method. Only simple types of controls were used in most cases and they were used in the orthodox method of connecting controls, in the first place, which was very similar and practically identical to all methods 615 at that time.

The Court: That is just where we get into a difficulty, we get into those general questions and we find the witness does not know. He surmises but he does not know.

Mr. Moore: Q. When did you move into your present place of business?

A. In the winter of 1929, early.

Q. And how long had that building been standing when you moved into it?

A. It was new. I had just completed it.

Q. Did it have a heating system?

A. We installed a heating system.

Q. You did yourself?

A. Yes, sir.

Q. Was there any particular problem in heating this new building of yours?

A. Yes, sir.

Q. What was it?

A. Our building was divided into two distinct rooms with quite a different heating requirement in the two rooms and quite a variation of the requirements for the two rooms. The front room or show room and offices were well enclosed

with little exposure and required a very steady even heating condition and were little affected by solar effect.
616 Now, the shop room in the rear of it had a large skylight, 12 to 24 feet in the top. When the sun was shining it required no heat at all, even in severe weather, but when we found occasion to ventilate heavily, due to fumes, it would require a great deal of heat. So the requirements of those two rooms were vastly different and really unpredictable from time to time. So it was necessary to control both rooms completely independently of each other operating from the same heating plant.

Q. What kind of heating plant did you put in?

A. Steam boiler, steam plant.

Q. How did you heat these two rooms?

A. Well, there is no basement in the building, so it was necessary to place the boiler on the same floor with the rooms, and we decided to use the convexion heaters as a means of driving the heat where we wanted it. So we placed one convexion heater in the front room and one convexion heater in the rear room, each controlled and operated independently.

Q. What do you call a convexion heater? What does it look like?

A. It is a radiator, either steam or hot water, with a fan back of it to force the air through rapidly and carry
617 the heat to the point desired.

Q. What kind of an oil burner did you use with the steam heating?

A. This job has an Electrol oil burner.

Q. Now, what make thermostat did you use?

A. I used a Mercoid thermostat.

Q. Was it their standard thermostat?

A. Are there standards?

Q. The ones that you bought from Mercoid, were they the regular standard thermostats?

A. They were not.

Q. What few changes, if any, did you ask for?

A. I asked for a two-circuit thermostat, in which case they furnished what they call a two-pole thermostat which I used as two-motor single pole.

Q. Did you have any correspondence with Mercoid in regard to this particular type of thermostat?

A. Yes, sir, I did.

Q. I show you a photostat of a letter here marked for

identification Mercoid Exhibit III and ask you if you recognize that?

A. Yes; I wrote this letter and signed it.

Q. That is signed in your own handwriting, is it?

A. Yes, sir.

618 Q. And that refers to a wiring diagram being attached?

A. Yes, sir.

Q. I show you here a wiring diagram marked for identification Mercoid Exhibit JJJ and ask you if you can recognize that?

A. Yes; that is the wiring diagram I made and sent along with this letter.

Q. There are notations there too. Who made them, do you know?

A. All in my handwriting, with the exception of one word here which was penciled in by some one.

Mr. Moore: These two exhibits, Mercoid Exhibits III and JJJ, are offered in evidence as MERCOID EXHIBITS III and JJJ.

The Court: Any objection?

Mr. Freeman: No.

The Court: They may be received.

(The documents were so marked.)

Mr. Moore: They will also be identified.

Q. Now, Mr. Portner, here is an announcement which is marked for identification Mercoid Exhibit LLL; do you recognize that?

A. Yes. This is an announcement of the opening of our store after its completion.

619 Q. And it is signed at the bottom. Whose signature is that?

A. My signature.

Q. Now, Mr. Portner, after you sent Mercoid this wiring diagram and this letter, this letter was dated November 22, 1928, did you have your heating system or rather the boiler in place at that time in your shop?

A. What is the date?

Q. It says November 22, 1928.

A. The boiler was not then placed.

Q. What did you do after writing that letter to the Mercoid Corporation, in which you enclosed that wiring diagram?

A. You say what did I do?

Q. Yes, in the natural course of events. Did you wait

until you got the controls from the Mercoid Corporation?

A. No, I did not. We proceeded to put the boiler in and operate it under partial control during construction, and as soon as the building was sufficiently completed that the balance of the wiring and the other controls could be installed, they were installed and completed in a complete and finished manner.

Q. I show you here an enlarged photograph of one of Mercoid's exhibits and ask you if you recognize that?

620 A. Yes.

Q. And that was taken in your shop, was it not?

A. Yes, sir.

Q. Now, there are some small photographs here, Mercoid Exhibit MMM-1, what does that show?

A. Well, that was taken in my show room facing the front office, showing the thermostat which controls the heat in that room and the grill that is in front of the convexion heater where the heat is delivered.

Q. Now, this photograph No. 2, where was that taken?

A. That was taken in my shop in the forward end, toward the back, showing part of the boiler and the rear convexion heater.

Q. And No. 3.

A. Taken in my shop also, showing the boiler and all of the controls pertaining to the heater in the shop room.

Q. And this last photograph, Mercoid Exhibit MMM-4, what does that show? Where is that looking?

A. Well, that is looking toward the front from the shop, including the boiler and the same controls shown in the other, also the motor operating the convexion heater for the front room.

Q. Now, you said this photograph, No. 3, showed the controls that are in the shop, is that right?

621 A. Yes, it shows all the controls on the whole job except the thermostat for the front room.

Q. Now, will you please take a pointer and step down here to this enlargement of that photograph and point out to the court the various controls that you installed in this heating system and how this heating system operated. You can use this wiring diagram. I might state Mr. Black testified in connection with this wiring diagram that the red circuit is the line circuit and the blue circuit is the circuit that controls the fans of the convexion heater.

A. Well, we have our line coming in at this point here, and this is the common line. We have one going to the

oil burner motor; one going to the unit heater motor; also to the other unit heater motor, which is a common wire.

Now, the control wire or the other side of the line from the unit heater comes back through an aquastat which closes on a rise of temperature and opens on a drop of temperature, passing back through the one pole, or one switch in the thermostat, and back to the other side of the line; the one from the other unit heater being identical.

On the oil burner circuit we pass through the other
622 tube of our thermostat, back to our burner through the steam limit control and a low water control combination, as this is, back to the burner and through to the other side of the line, thus completing that circuit.

We have here another aquastat connected in parallel with the burner thermostat switch so as to operate the burner to provide the domestic hot water supply the year around regardless of the heating requirements of any part of the building. I think I have covered it completely.

Q. Now, what is this control 35? You have a photograph over here. Can you point out that control 35 you call an aquastat?

A. Yes. That is this control here on the front room. This is the one here on the rear room.

Q. Now, can you tell from that photograph the make of that aquastat, who made it, or any trade name on it or anything?

A. It is either Con-Tac-Tor or Time-O-Stat. I forget the name.

Q. Well, can you see what it is?

A. I think it is Time-O-Stat. I am not sure.

Q. Come around on this side here.

A. I cannot be sure, Mr. Moore.

623 Q. Now, where is the motor of the convexion heater for the front room shown in that photograph?

A. Right on the other side of this partition here. It is driven by this shaft. It used to drive the motor direct but the speed was too high and in order to reduce the speed we put the motor to one side and put this belt on it.

Q. What is this black pipe leading from this aquastat under the fan motor back to the furnace?

A. This is the return line for the condenser for the convexion heater.

Q. And where is the line that goes to the convexion heaters?

A. Right there.

Q. Where does that come from?
A. It comes off the top of the boiler.
Q. That is where the steam passes through that upper pipe, through the coil of the convexion heater, and back to the boiler?
A. Yes.
Q. Now, where is the pipe that leads the steam to the convexion heater in the rear of the room?
A. This one.
Q. That is the upper one?
624 A. Yes, sir.
Q. Does it show the return steam pipe from the convexion heater in the rear room?
A. Right here.
Q. And that is the one also that has that clamp-on control that you call an aquastat?
A. Yes, sir.
Q. And that is shown right where the pointer is?
A. Yes, sir.
Q. Now, what is this black thing here in the middle of this pipe, in the middle of the boiler?
A. That is a combination of pressure limit control and low water cut-out.
Q. And who makes that, do you know?
A. Made by the Mereoid Corporation.
Q. Now, what is the function of that control?
A. Well, in this case when the steam pressure reaches five pounds this control will open and stop the burner motor, or if the water is neglected and allowed to get low in the boiler it will also stop the burner motor.
Q. Yes. Where is the burner?
A. Right here.
Q. Right below the fire door in the furnace?
A. Yes.
625 Q. And that is connected up electrically through this high pressure and low water control?
A. Yes, sir.
Q. And that is shown on your diagram here as what?
A. Shown here.
Q. M-612?
A. Yes.
Mr. Freeman: I think that is No. 612.
Mr. Moore: Yes, that is No. 612.
The Witness: Yes, I think it is.
Mr. Moore: Q. Where is your room thermostat?

A. Right here.

Q. Now, you said that had two tubes?

A. Yes, sir.

Q. Does it show in that picture?

A. Yes, I would say it shows.

Q. It shows better in the picture of your front office, Mercoid Exhibit MMM-1, does it not?

A. Yes, this shows distinctly.

Q. Now, Mr. Portner, referring to your wiring diagram, suppose your heating system had been idle for a long time and it got cool, and you wanted heat in your shop; what happens if it got below the setting of your room thermostat?

626 A. The room thermostat will close which completes the circuit immediately on the oil burner, because the boiler being below steam we would find the pressure switch closed. The burner would start up and operate until it made sufficient steam to pass through the convexion heater, and the heat condensit or steam starting back the return line to the boiler, passing this aquastat, would close this aquastat.

Now, when that aquastat closes that completes the circuit for the fan motor, as the other break in the circuit is the other tube of the thermostat which closed with the temperature. So your fan motor will operate delivering heat to the room. Is that sufficient?

Q. Suppose the cold air blows on this room thermostat and your burner keeps on burning and keeps on circulating the air through; what happens, if anything?

A. Well, if only one unit heater is operating in our case, the boiler being of sufficient capacity to carry both heaters at full capacity, the burner will generate steam more rapidly than one unit heater will dissipate it. Consequently, the steam pressure will build up on the boiler to the setting of the limit control, and it will open, shutting down the burner, but the thermostat still being closed, calling for heat, and the aquastat still being closed on

627 the line, because the pipe is still hot, the fan will continue to run until it dissipates the steam accumulated in the boiler, and drops the steam pressure to the setting of the pressure switch, which in this case is one pound, and this pressure switch will again close, start the burner up again and repeat the process until such time as the thermostat is satisfied, in which cae when the thermostat opens it breaks both switches, shutting down both burner and fan.

Q. Now, you have two switches in your thermostat. When the thermostat operates in one way or the other, do they both operate in the same way at the same time?

A. Yes, they both close simultaneously.

Q. Now, which circuit goes through which switch? Can you point out there? You have two switches in the room thermostat.

A. Well, one switch would be connected between this wire and the blue wire, and the other one between the left red wire and the center wire.

Q. So that when the thermostat calls for heat then the red circuit would be completed through one of the switches?

A. Yes.

Q. But it could not be completed through the blue circuit and the other switch because your aquastat had
628 not closed, is that true?

A. That is true, if the pipe is cold and no heat available, no steam in the unit heater.

Q. So when it is operating normally the blue circuit is closed through one switch and the red circuit is closed through the other switch, is that correct?

A. That is correct.

Q. And if you had an excessive steam pressure and the red circuit broken, it would not in any way affect the position of the room thermostat, would it?

A. No, sir.

Q. And the blue circuit would be completed through the other switch?

A. That is correct.

Q. And it would continue to operate the fan until the pressure had become normal again or the room thermostat satisfied?

A. Correct.

Q. Now, I think that is all. I think you had better get back and I will ask you some more questions.

(Witness resuming stand.)

Q. Now, Mr. Portner, do you know how it was that you came to use Mercoid controls in the thermostat and a high pressure and low water control and yet use the Time-
629 O-Stat control to clamp on?

A. Well, we carried in stock numerous controls of different makes, and sometimes a control of a certain make serving the same purpose was more adaptable and easier to apply than others, and then they were interchangeable and serving the same purpose. I know of no special rea-

son why those aquastats are of that particular make rather than Mercoid or some other make, and I don't remember, but there is no doubt in my mind now we had them on the shelf.

Q. Did you put the controls in this heating system in the positions as shown now yourself?

A. Well, I either did or my men did under my supervision.

Q. Who were the men under your supervision, do you remember?

A. Yes. Charles Hill was one of my men; Weston McGill another.

Q. How long was Charles Hill with you before you went into your new shop in 1929? I mean just generally.

A. I would say three years.

Q. Is he with you still?

A. No, he is not.

Q. How long ago did he leave you? Just offhand.

A. Five years ago.

Q. What is he doing now, if you know?

630 A. He is doing similar work.

Q. Now, can you say whether or not these controls illustrated in these photographs are the original ones that were put in by you and Mr. Hill and the other men when you installed this heating system some time in the winter of 1928-1929?

A. Every control shown there and every control on this job are identically the same ones and have never been disturbed since the job was started with the exception of the oil burner safety shunt control, which is the only one that has ever been disturbed.

Q. Has that anything to do with the heating system?

A. Well, not properly with the controls. It controls the safety device of the burner itself.

The Court: I will have to ask you to recess at this time.

Mr. Freeman: I am wondering if I might ask Mr. Portner if we can see the installation, since it is close to Chicago, either this evening or the first thing tomorrow morning, preferably this evening?

The Witness: You certainly may, yes, sir.

Mr. Freeman: Is that agreeable to you, Mr. Moore?

Mr. Moore: Very agreeable.

631 Q. Mr. Portner, at the close of the taking of your testimony yesterday there was some discussion about

an inspection of your property. Was an inspection made last evening?

A. Yes, sir.

632 Q. And do you remember who was out there?

A. I don't know any of the gentlemen's names.

Mr. Freeman: We will put on the record that Mr. H. R. Van Deventer, George H. Fisher and Ray Rusher were there in behalf of Minneapolis-Honeywell Regulator Company.

Mr. Moore: All right.

Mr. Freeman: You might put on the record who of Mercoid were present, as long as you are doing it.

Mr. Moore: Mr. Frank Black and Mr. Courteol were present at that demonstration on behalf of Mercoid Corporation.

Mr. Freeman: Call it an inspection rather than a demonstration, please.

Mr. Moore: Q. Mr. Portner, did the heating system cycle or did it go through the various phases which you described?

A. Yes, it did.

Q. In connection with this diagram?

A. Yes, sir.

Mr. Moore: The enlarged photostat of the Portner diagram with the colored circuits is offered in evidence as MERCOID PHYSICAL EXHIBIT JJJ-1.

(The photostat was so marked.)

Mr. Moore: Q. Mr. Portner, when was the last time

633 before coming into court that you saw this wiring diagram which has been introduced in evidence as Mercoid Exhibit JJJ? I will show it to you. When was the last time before coming into court that you looked at this diagram?

A. Well, the last time would have been in your office, Mr. Moore, probably thirty days ago.

Q. When was this first called to your attention by me?

A. Oh, November 6th, when you called at my place.

Q. And had you seen that diagram prior to that date?

A. I had not seen it from the time I made it until that date.

Q. Were you ever asked to produce any records as to when the various controls that are shown in the diagram and in the photographs were purchased by you?

A. Yes, I was asked.

Q. And when were you asked to produce those?

A. On November 6th.

Q. And what was your reply at that time?

A. My reply at that time was that we kept no records beyond five years, and I was of the impression that we had no records back of that date.

Q. Since that time have you been able to find any records?

A. Yes; I happened to think that I had put in one
634 large envelope all of the bills making up the cost of this building so that I could refer to them or have them up for anyone who might question the cost of the property, and I had that envelope stored away, but I had forgotten about it.

Q. Now, when did you find those records?

A. I found them just last evening, by the way.

Q. And can you produce them?

A. I can produce some that we selected from it, yes, sir.

Q. I notice that you have produced a bill from the Leader Iron Works, Decatur, Illinois, dated 12-13-28. Can you tell the court what that is for?

A. That is the bill for the boiler on which these controls are installed.

Q. I show you another bill dated 12-24-28 from Johnson Fan and Blower Company. Will you tell the court what that bill is for?

A. That is for the unit heater or convection heater.

Q. How many?

A. Two of them.

Q. And are they the convection heaters that you installed in your show room?

A. Yes, sir.

635 Q. And in the office?

A. In the office and in the shop.

Q. I show you another bill from The Mercoid Corporation, invoice No. 85319, dated January 22, 1929, and ask you what that is for.

A. Well, that was for controls that we purchased for this job.

Q. Were all of these controls put on this particular job?

A. No, they were not. I think the thermostats only on this were used on the job. I think the rest of them went on to the shelf to replace ones that we had taken off the shelf and put on the job prior to the receipt of these.

Q. Now, there is a Mercoid Figure 71 combination sin-

gle pole single circuit one to four pounds pressure control and low water cutoff. What does that refer to?

A. That refers to the pressure switch and the low water cutout as used on this boiler. However, this type 1 which is identified by the serial number is not the one that is on the boiler but a model 71 of the same type is.

Q. Where did you get the one that is on the boiler?

A. Bought it from Mercoid Corporation.

636 Q. When did you buy it from Mercoid?

A. Some time prior to the date of this installation, because it was in our stock.

Q. Yes. Now, the next one is Mercoid Figure 35, single pole single circuit 110 to 200 degrees Risertherm. What is that instrument?

A. That is the aquastat that we speak of in the drawing, and is interchangeable and would serve the similar purpose exactly as the Time-O-Stat that we did use.

Q. I call your attention to catalog No. H-3 of 1928 and ask you to look at page 10. This page is entitled, "The Mercoid Risertherm." "Series type control with Mercoid thermal element," and there is an illustration in the picture of Figure 35 Risertherm. That is the instrument you just referred to as a Risertherm, is it?

A. Yes, sir.

Q. I also call attention to page 18 of this catalog, Mercoid combination controls low water and pressure. Now, there are three pictures in here, Figures 71, 72 and 73. Are they pictures of the control that you used?

A. Figure 71.

Mr. Moore: This catalog has been marked for identification Mercoid Exhibit H.

Q. Now, the next item on that bill, Mercoid 845-23-8,
637 it looks like, or 7—Figure 21, double pole single circuit 56 80 degree HTG thermo. What does that relate to?

A. That relates to the room thermostats that we purchased and installed on the job and are now in use there.

Q. I show you here Mercoid Bulletin E-2, dated December, 1925, marked for identification Mercoid Exhibit DD, and ask you what Figure 21 illustrates on that?

A. Well, the thermostat illustrated here is Figure 21 thermostat.

Q. That is the one referred to?

A. Yes, sir, excepting we used it in double pole and it is illustrated in single pole.

Q. All right.

A. Yes.

Q. Now, on the back of that page, under the title, "Federal Mercoid Switches," there is a Figure 2 shown there. What is that, do you know?

A. That is a double throw or three-way switch.

Q. Now, you have another item, "adjustable Connections." Do they relate to this installation you have been referring to?

A. I don't remember, but I assume there was some question about the range of operation and they specified a
638 particular length of control bar, it would seem to me. I don't remember.

Q. And where did these originals come from?

A. The originals—

Q. That you have in your hand?

A. These came from Mercoid.

Q. No, where did you get them, the ones that you have in your hands?

A. Where did I get them? When I installed them.

Q. No, you said you discovered these last night?

A. Oh, the papers?

Q. Yes.

A. Yes, I got these in the envelope which contains all of the bills.

Q. And that was at your plant?

A. Yes, sir.

Mr. Moore: Photostats of these three bills are offered in evidence as MERCOID EXHIBIT KKK-1. They are the Mercoid Corporation invoice No. 85319, the Johnson Fan and Boiler Company No. 3961, and the Leader Iron Works, customer's invoice dated 12-13-28.

(The documents were so marked.)

Mr. Moore: Q. Do you remember, Mr. Portner, after you send this letter of yours and the diagram to Mer-
639 coid Corporation in 1929, if you had any discussion with any of the Mercoid representatives in regard to this two-circuit thermostat?

A. Why, as I remember, I believe I had a telephone conversation following. I think Mr. McCabe called me, as I remember, back regarding it, and in the conversation I asked him to go ahead and ship the controls out. As I remember, that is what took place.

Q. I notice below the right hand thermostat on this wiring diagram, Mercoid Exhibit JJJ, there is a pencil sketch. Do you remember anything about that?

A. No, I don't remember a thing about it.
Q. Would that—
A. I don't think that I put it on there.
Q. Could you tell what it indicated?
A. It indicates to my mind a three-way switch.
Q. Is that the same as this Figure 2?
A. Yes.
Q. Three-way switch?
A. It would be, yes.
Q. On Mercoid Bulletin E-2 of 1925?
A. Yes.
Q. You have referred in your testimony as to aquastates and have identified these clamp-on instruments on the
640 these black pipes in the enlargement of your photograph No. 3, Mercoid Exhibit MMM-3. I call your attention here to "Automatic Controls for Oil Burners, 1929," a catalog put out by Time-O-Stat Controls Company of Elkhart, Indiana, and call your particular attention to page O-26, which is entitled, "Surface Type Limit Control for Hot Water Systems," and below that there is an illustration entitled, "The No. 56 Aquaswitch." Now, is that the instrument that you have been talking about as an aquastat?
A. Yes, it is.
Q. And is that the type of instrument that you put on the pipes?
A. Yes.
Q. In your installation?
A. Yes, that is the instrument.
Q. I believe this catalog describes this particular aquaswitch as for use on hot water systems. Had you ever used this aquastat on a steam system before you put it on the heating plant in your place?
A. No, I never had. That is the first installation on a steam system.
Q. How did you know it would work on a steam system when it specified for hot water systems?
641 A. Well, I don't believe everything I read and I analyze it in my own mind. It worked from heat, and steam will generate heat for actuating the switch the same as water.
Q. I wish to call attention to the descriptive matter on page O-26, which reads under the title, "Dual application":
"Like the other Time-O-Stat limit controls, the No. 56 and the No. 56-B Aquaswitch can be used as the operating

control of the burner or as a dual control in conjunction with a room thermostat. When adjusted to maintain water temperatures which will provide a satisfactory temperature in the room, the full operation of the burner may be accomplished with the Aquaswitch. Where the temperature control is desired from a room thermostat, the temperature setting on the Aquaswitch is advanced, and it then acts as a safety cut-out should the room thermostat fail to cut off the burner before an excessive water temperature is reached."

Now, also I would like to call attention to the fact that the No. 56-B aquaswitch is also illustrated on page O-27, and there is at the bottom of page O-27, under "Horizontal Installation," a picture of a No. 56 aquaswitch fastened onto a pipe. Does that illustrate the way in which you fixed the aquastats on the steam pipes running in the convec-
642 tion heaters in your establishment?

A. Yes, sir.

Mr. Moore: Photostat copies of the correspondence, the first page, inside, and pages O-26 and O-27 are asked to be marked for identification as MERCOID EXHIBIT RRR.

(The documents were so marked.)

Mr. Moore: Q. Mr. Portner, did you look again at these aquaswitches or aquastats last night when your heating system was being inspected?

A. Yes.

Q. Did you notice what the wording was on the aquaswitch on the cover; was there any number on it, do you remember?

A. I didn't look or pay any attention.

Q. Mr. Portner, I show you here a letter addressed to The Mercoid Corporation, dated January 19, 1929. Do you have any recollection of that letter?

A. Why, it is my signature on the letter.

Q. You wrote the letter?

A. I—

Q. Never mind. This letter states: "The controls as ordered for my new building"—

Mr. Freeman: Let him answer as he goes along. You said, "Never mind."

643 Mr. Moore: What is that?

Mr. Freeman: He was going to read the letter. He had some answer and he was interrupted.

Mr. Moore: He was going to read the letter.

Mr. Freeman: Are you a mind reader?

Mr. Moore: I started to read. Do you want to read it?

Mr. Freeman: I don't care what it is. If you want to stand up there and testify or tell him what to say, get yourself sworn so we will have the opportunity of cross-examining.

Mr. Moore: I will be glad to do so. The court asked us not to have letters read into the record.

Mr. Freeman: Go on with your examination.

Mr. Moore: "The controls as ordered for my new building have not yet been received and we are now in need of them. Will you please see that they go forward without further delay?"

I ask this letter from Mr. Portner, dated January 19, 1929, be marked for identification MERCOID EXHIBIT SSS.

(The letter was so marked.)

644 Mr. Moore: Q. Do you have any recollection when you received this Mercoid thermostat with the two switches in it?

A. I don't remember the date, no.

Q. Well, was it before or after you moved into your new place of business?

A. Oh, it was before we moved in.

Q. This invoice is dated January 22, 1929.

A. Yes.

Q. That is, the room thermostats—

A. They were received before our opening of the place.

Q. And that was the opening that you announced?

A. Yes, sir.

Q. By a letter?

A. Yes, sir.

Q. Now, I believe you stated yesterday that you did not wait for these two room thermostats with the two circuits or two switches in them, but I believe you stated that you went ahead with the rest of the installation, is that correct?

A. Yes, we operated the plant for a period of time during construction on boiler pressure control alone; then we operated it after that for a while without the thermostats, because they had not been received. I remember that.

645 I would not know just how long,—a week or ten days or two weeks, maybe.

Q. But they were in operation, the two room thermostats were hooked in circuit when you had your opening?

A. Oh, yes, they were operating sometime before that.

Q. And all these controls, I believe you state, as shown

in this picture and in the pictures taken on November 26th, are the controls as originally installed by you?

A. Yes, sir.

Q. And that was prior to the date of your opening and prior to the time that this letter announcing the opening was sent out?

A. Yes, sir.

Q. Have you any distinct recollection as to when this opening announcement letter went out?

A. No, I can't tell, without referring to the dates that are on the letters. I don't remember the dates.

Q. Well, I believe I showed you that letter and it did not have any date on it. I will show it to you again. This has been marked for identification MERCOID EXHIBIT LLL.

(The document was so marked.)

A. There is nothing here to indicate the exact date, but if my memory serves me correct, we had a grand open-
646 ing approximately March 1st. However, we were open and doing business some two or three weeks prior to that.

Q. Mr. Portner, you ordered some Mercoid Riser-therms; were you acquainted with the Risertherm before you placed that order?

A. Yes, we had used some.

Q. Was that before you had made this installation in your shop?

A. Yes.

Q. And why didn't you use Risertherms in that installation, do you remember?

A. Well, probably we didn't happen to have them on the shelf at the moment when we wanted to put them on. Another reason at that time would be that we were having considerable trouble with our power elements in those Risertherms. They were not right. And I know we were shying from the use of them to a great extent.

Q. So you put the Time-O-Stat up switch on the pipes in place of the Risertherm?

A. Yes, sir.

Q. And you had those in stock?

A. Yes, sir.

Q. Do you remember how long you had had them in stock?

A. I wouldn't have any way of knowing that. The

647 stock comes and goes. I don't have any way of knowing how long any particular instruments may be in stock.

Q. What is your practice when you take an instrument out of stock and put it in an installation; what do you do after that?

A. We buy to replace the stock.

Mr. Moore: Direct examination closed.

Cross-Examination by Mr. Freeman.

Q. You are telling this court that all of the controls appearing on the photographs Exhibits MM-1 to MM-4, inclusive, were installed in your place of business in Wheaton, Illinois, prior to the announcement of the formal opening of your place of business, is that correct?

A. Yes, sir.

Q. And that includes the pressure control, does it not?

A. Yes, sir.

Q. And by pressure control, we are both talking about that instrument known as type No. 71, correct?

A. Yes, sir.

Q. And you are also telling us that the instruments which you call aquastats, made by Time-O-Stat Controls Company, of Elkhart, Indiana, were also installed prior
648 to your formal opening?

A. Yes, sir.

Q. And you are telling us that there have been no changes whatsoever in these controls which are now found upon the installation, except as to a safety device for the oil burner?

A. That is true. May I qualify it this way: I have been away from the premises as much as three weeks to a month at a time. In the interval some man in my employ may have taken a control off and used it on another job, and replaced it with a similar control, but not to my knowledge.

Q. Well, then, you are not telling us now upon cross-examination that the controls which appear in the pictures were the identical controls, as you had me believing last night and up until a few minutes ago, that were installed by you prior to the time of the opening of your place of business in or about March or February of 1929?

A. I still say the same thing; to my knowledge, that is true.

Q. You do understand the seriousness of your testimony with respect to stating as a fact certain things that may have a bearing upon somebody's patent; you understand the seriousness of that?

649 A. Yes, I do, certainly.

Q. And you are now telling us that the instrumentalities which are found upon the photograph, which was taken in November, 1941, are the same instrumentalities that you had in your installation of March or February of 1929?

A. I still say yes, so far as I know.

Q. Now, yesterday I was led to believe that the No. 71 control, which you referred to as a limit control or pressure operated control, was the one which you received from the Mercoid Corporation in accordance with a document that has heretofore been introduced in evidence, or offered or identified, as Mercoid's Exhibit KKK, and today I understand you to say that you did not use that instrument but used a substitute instrument or one of like kind, is that correct?

Mr. Moore: The witness testified yesterday that he took this 71 from stock. He did not say that it was in accordance with the bill that you just handed him. He has also stated that it is his custom when taking an instrument from stock to order another one to replace it.

Mr. Freeman: Q. You knew last night when the instrument was checked as to serial number, that it was a serial number different than what appears on Exhibit KKK, did you not?

650 A. I learned that, yes, sir. I did not know it before.

Q. So you are now telling us that the instrument installed in your place of business, Figure 71, is not the instrument identified or referred to in Mercoid's Exhibit KKK?

Mr. Moore: He has never testified that it was the same instrument.

The Court: If you will bear with me, this gentleman is under cross-examination. You interfere with his cross-examination. That does not help him a bit. It does not help the case, either. Let him alone. If the question is objectionable, object to it. Don't interpolate suggestions or statements. It hurts your case, and hurts your witness. Go ahead.

The Witness: I don't remember the question, Mr. Freeman.

Mr. Freeman: Will you read the question to the witness?

(The question was read by the reporter as above recorded.)

The Witness: A. I can't remember that I identified or referred to this instrument as having been the one put on, Mr. Freeman.

Mr. Freeman: Q. I am now asking you whether or not the instrument installed is the instrument referred to in Mercoid's Exhibit KKK?

651 A. It is not.

Q. Do you know when you acquired the instrument,—and we are talking about the Figure 71,—that is installed in your place of business from the Mercoid Corporation?

A. I do not know when I acquired it; sometime prior to its installation.

Q. You have no records with respect to that purchase?

A. No, I don't keep them that long.

Q. Now, I understood you to say that you had the device in operation in a somewhat semi-automatic connection prior to the receipt of these controls, is that correct?

A. Yes, for a month before, approximately.

Q. Will you just tell me the controls that you had in use in that semi-automatic operating condition?

A. We operated only on the pressure limit control with the heater, convection heater fans running continuously, unless shut off manually.

Q. And what type of thermostats did you use, or did you use any thermostats?

A. I didn't use any.

Q. You did use an instrument known as a pressure control?

A. That is the one we are speaking about, Model 71.

Q. You did use that instrument?

652 A. Yes, sir.

Q. Did you have any other Mercoid thermostats on the shelf or in stock at the time you were running this so-called semi-automatic operation?

A. We had single pole thermostats, yes, sir.

Q. Are you telling us that the only controls used in the semi-automatic heating operation, which we now find upon the photograph, was a Mercoid Figure 71 control?

A. Yes, sir.

Q. Did you have the various safety controls for the oil burner?

A. Yes.

Q. And what started the oil burner operating?

A. We left it run continuous, except that it was shut down by the pressure limit control when excessive pressures were reached,—if.

Q. You did not use any thermostats to start or stop the oil burner?

A. We did not.

Q. Although you did use a control sometimes called in the trade an aquastat safety, did you not?

A. Yes, that was part of the oil burner itself, however. It was not located in the stack at that time either. That is the one control that we changed on the job.

653 Q. It was mounted on the instrument itself?

A. On the burner.

Q. And what kind of a control was it that was mounted on the burner?

A. It was a control similar to the start switch, except that it was built integral with the burner affected by the heat direct in the fire, in the fire box, rather than the heat in the stack, as the one now operates.

Q. And you left that control on the oil burner, and yet you ran the oil burner manually?

A. Yes.

Q. And when did you take off the safety device from the oil burner which came as part of the oil burner and substitute for it a stack safety of the kind we now have upon the instrument?

A. As I remember, some three or four years after the installation.

Q. And do you have any records with respect to the cost of your place of business that would show us today when you made that change?

A. No.

Q. That was a part of the cost of your building, was it not?

A. That change? No, I would call that maintenance, replacing a part that had deteriorated and become useless.

654

Q. And you kept no track of maintenance?

A. Yes, we do keep track of maintenance in our shop.

Q. Do you have any records or anything that might tell us when you changed the oil burner and put on the stack safety?

A. I don't think we would, because I think it is longer than five years ago.

Q. Did you know yesterday that Mercoid's Exhibit KKK gave the serial number of the Risertherm?

A. I had not noticed it, no.

Q. That came to your attention last evening?

A. I did not even know the serial number of the Risertherm was on there.

Q. Or the serial number of the—I used the term Risertherm and it should be Figure 71.

A. I know they carry a serial number. I did not even know it was on the billing. I did not pay that much attention to it, because I was not interested in serial numbers.

Q. Now, with respect to Figure 35, the instrument known as Risertherm, those that were ordered from The Mercoid Corporation, or at least those that are referred to in the shipping order, Mercoid's Exhibit KKK, were
655 likewise never used upon your heating plant?

A. That is correct.

Q. And you had at the time that you ordered or asked Mercoid about controls known as the Mercoid Risertherm controls made by another company in stock, had you not?

A. Yes.

Q. And you had in your stock, so I understand your testimony, at least three Time-O-Stat Controls Company controls, known under the trade name of aquastat?

A. Yes, sir, undoubtedly we did. I would not know that we had three. We may have received some a day or two or three days before they were installed. I would have no way of knowing that.

Q. You did not order any controls specifically from the Time-O-Stat Controls Company?

A. Not that I recall.

Q. Might you have ordered controls specifically from the Time-O-Stat Controls Company for this installation?

A. I might have done so, but I would not remember that, because we always stocked them at that time.

Q. So as the situation now stands, you ordered three Risertherm controls from The Mercoid Corporation and you may have ordered three aquaswitch or aquastat controls from the Time-O-Stat Controls Company to do the same job?

656 A. I may have done that.

Q. And might you have ordered then from the Time-O-Stat Controls Company a control that would be

pressure operated, that might do the same job as the Mercoid Figure 71?

A. I could have done so, undoubtedly.

Q. And I take it then that you might have ordered for this specific job from Time-O-Stat Controls Company thermostats?

A. I could have, but I did not.

Q. You are sure you did not with respect to thermostats?

A. Yes, and I am sure I did not with respect to pressure controls, either, because I never stocked Time-O-Stat pressure controls, never used one in my life that I recall.

Q. But you did use the Mercoid No. 71?

A. Yes, sir.

Q. How many controls do you usually stock, speaking now of the Figure 71 type, at a time?

A. One, sometimes two, depending on how much prospective business we have.

Q. So that if you run along with a stock of two and you sell one, do you immediately replace that stock?

A. That was our usual practice, yes, sir.

Q. And is that true likewise with the Figure 35 Riser-therm?

657 A. Yes, sir.

Q. And is that true likewise with room thermostats?

A. Yes, sir.

Q. Now, if you had some Time-O-Stat controls, which appear upon the photographs that are in the installation under consideration, would you replace the three Time-O-Stat controls with three Mercoid controls?

A. I slipped on hearing that, Mr. Freeman. May I have it repeated?

Mr. Freeman: Will you please re-read the question, Mr. Reporter?

(Mr. Freeman's last question was read by the reporter as above recorded.)

The Witness: A. I don't get the meaning of that question, Mr. Freeman.

Mr. Freeman: Q. I understood you to say that when you sold a job that included a specific control that you replaced your stock with a like control?

A. Not necessarily a like control. It might be one of different make to serve the same purpose, not necessarily the same make, but one that would serve the same purpose.

Q. So you replaced the three Time-O-Stat controls

which now appear in the photograph and in the installation with three Mercoid Risertherm controls?

658 A. Yes. I may still have had more Time-O-Stat controls left in stock, however.

Q. Now, a few minutes ago I understood you to say that you were having trouble with the Mercoid Risertherm controls.

A. That is right.

Q. So you used Time-O-Stat controls.

A. That was one reason, yes.

Q. Now, having trouble with Risertherm controls made by The Mercoid Corporation, I now understand that you replenished your stock with three Risertherm controls made by The Mercoid Corporation, with which you had trouble, for three Time-O-Stat controls that you were going to use in your installation; that is correct, is it not?

A. It would appear that way. I cannot recall, Mr. Freeman, twelve years ago just exactly. Those may not have gone into our stock at all, those three Mercoids. They may have gone on a job the day they arrived.

Q. What job?

A. Any job that we were doing. We were doing a great many in those days.

Q. You were using Risertherms?

A. Yes, sir, as well as Time-O-Stats.

Q. Now, as a good practical service man you would

659 not inflict upon a good customer of yours three Risertherms which you were having trouble with, when you yourself were using Time-O-Stat controls?

A. Oh, that has been done, yes, sir.

Q. That is not one of your practices, however?

A. We have done it.

Q. Even though you know that the controls might not stand up and you have good controls made by some other company that you yourself use, you still give to your customers the controls that you had trouble with?

A. We did, yes, sir. We did that, certainly, knowing that the manufacturer made anything good that was not right.

Q. As a matter of fact, as a service man you know that it would have been easier to put inferior controls upon your own installation and make a change if they went sour, than to have to go out to some customer's place and substitute controls; you know that to be a fact, don't you, Mr. Portner?

A. Well, it does sound logical.

Q. So in one case the thing you did was the illogical thing?

A. That is probably true.

Q. Now, if you had Time-O-Stat controls in your
660 place of business, why was it that on January 19, 1929, you wrote to The Mercoid Corporation asking them or telling them that you were waiting for the controls ordered for your new building? Why didn't you use the Time-O-Stat controls, which would have given you automatic operation of the two unit heaters?

A. I told you a while ago that Time-O-Stat controls themselves may have come in the day before they were installed, and we may have installed the first ones to arrive. I am not certain. Those are details I do not remember.

Q. But you do remember, and you say here without hesitation that the Time-O-Stat controls now found in the installation were all there prior to your formal announcement of the opening of your place of business?

A. Yes.

Q. And you are saying that after mature consideration and reflection?

A. Yes, sir.

Q. Do you know when the Time-O-Stat Controls Company was incorporated?

A. I have not the slightest idea.

Q. Do you know when the Time-O-Stat Controls Company began making controls of the kind here involved?
661 A. No, sir.

Q. You do have a 1929 catalog?

A. I do not.

Q. Well, you referred to one here this morning.

A. I do not ever remember having seen one before. I probably did.

Q. Do you know where the catalog came from that you referred to this morning?

A. Mr. Moore furnished it here.

Q. When did you see a catalog of the kind that we have here now?

A. When did I see one?

Q. Yes.

A. Before?

Q. Yes, first.

A. I would not remember. Undoubtedly the catalog was out back in the days of this installation. I assume

that it was. We selected this instrument from something.

Q. I do not want any assumptions. I am trying to get some facts here with respect to a specific installation.

A. We had some reason for selecting the instrument from some illustration or something that we saw. We knew about it from somewhere when we purchased it.

Q. Did you know that the control which is the Time-
662 O-Stat control was of the kind made by the Con-Tac-Tor Company?

A. I did not know.

Q. You did not?

A. No, sir. I do not recall it. I may have known it, but I do not recall.

Q. Time-O-Stat, though, stands out in your mind?

A. Yes.

Q. And the name Con-Tac-Tor Controls Company or Absolute Con-Tac-Tor Company—

A. I remember that name.

Q. You remember the Absolute Con-Tac-Tor?

A. Yes, sir, I do. Elkhart, Indiana, I believe.

Q. Now will you tell us whether or not the control of the kind that we are now talking about; the aquastat or aquaswitch, is similar to the control made by the Absolute Con-Tac-Tor Company?

A. I could not tell you that.

Q. You do not remember.

A. I don't remember.

Q. Did you handle Absolute Con-Tac-Tor Company controls?

A. I do not remember that.

Q. Do you know when you first started to handle Time-O-Stat Controls Company controls?

A. I do not.

663 Q. But apparently, in accordance with your testimony, it was sometime prior to the opening of your place of business?

A. We had used them, it seems I recall, a year or two prior to this installation. I am not quite sure about the length of time.

Q. That is a year or two prior?

A. That is as I recollect. It may not be definite, Mr. Freeman, but sometime before.

Q. Would you be willing to say here that you put on Time-O-Stat controls a year after you began to handle Time-O-Stat Controls Company controls?

A. Say that again.

Mr. Freeman: Will you re-read it, Mr. Reporter?

(Mr. Freeman's last question was read as above recorded.)

The Witness: A. No, I would not say that, because I do not remember.

Mr. Freeman: Q. Do you have the oil burner invoice in your envelope where you kept the various records with respect to this installation?

A. The oil burner invoice was not there.

Q. What other items did you find in this envelope? I am not trying to pry into your personal affairs, so I
664 will limit my question to invoices that you have with respect to the installation, including the boiler as well as the piping, and those things that go to make up your boiler installation.

A. We had an invoice from the McMaster Supply Company for pipe and fittings, but it included a great many other fittings and additional pipe over and above what was on this job. They were put into stock.

Q. Did you segregate on that particular invoice or allocate those parts that went into the cost of the building?

A. Yes, we did.

Q. And that appears on the invoice?

A. I am not sure what appears on the invoice, but it appears on our records that we set up at that time.

Q. Do you have a record that might here be produced to show some of the facts with respect to this particular installation?

A. Not any more, no, sir. I will be glad to produce that invoice, if you are interested in it.

Q. I would like to see it, yes.

A. I haven't it here.

Q. It is at home?

A. Yes.

665 Mr. Freeman: I am wondering, your Honor, if we might release this witness for the time being and let Mr. Moore proceed with another witness and then let me have the opportunity of further cross-examination?

The Court: Any objection to that?

Mr. Moore: I do not exactly understand. You want to suspend examining him?

Mr. Freeman: Yes.

Mr. Moore: You want him to get that invoice you referred to?

Mr. Freeman: And I might say anything that has to do with this installation.

Mr. Moore: You want him to go home and dig those up?

Mr. Freeman: I do not care where he gets it from, as long as it has to do with this installation.

Mr. Moore: There will be no objection to that.

Mr. Freeman: I might say also, if you have any invoices with respect to your purchases from the Time-O-Stat Controls, which are absent here, if you have any such invoices, I would like to see them.

Mr. Moore: That will be agreeable to me, because I did not know he had any of these invoices he presented this morning. He said he selected them. Now, Mr. Portner, you will have to go home and bring down that envelope
666 and all of those invoices and any other records that you may have relating to the installation here.

The Witness: All right, sir.

Mr. Freeman: Particularly as to when you first carried on your business with the Time-O-Stat Controls Company.

The Witness: I do not know that I have a thing on that, Mr. Freeman.

Mr. Freeman: Well, if you have, produce it.

The Witness: That will be in our regular file, I am thinking, and those were discarded.

The Court: When do you want this gentleman to return?

Mr. Freeman: Any time that he can gather this information. I know we can cooperate with Mr. Moore. We will suspend at any time and put him back, subject, of course, to the approval of your Honor.

The Court: When can you return, Mr. Portner?

The Witness: Any time. I am anxious to get it over, Judge. We are terribly busy.

The Court: How long will it take you to go out there?

The Witness: It takes two hours to make the round trip, if your trains match up. It takes longer, however, if they do not.

The Court: What I am thinking of, there is no need of his getting back here by four o'clock this afternoon.

667 Mr. Moore: If he is back by four?

The Court: I say there is no need of his getting back here at four o'clock this afternoon.

Mr. Freeman: If he gets back by three, that will be satisfactory.

The Court: If you can get back by three, come here,

but if you cannot get back before three, come here the first thing in the morning.

The Witness: Very well.

Mr. Moore: All right.

(Witness excused.)

668 Mr. Portner, do you have any Time-O-Stat Controls Company's invoices among the records you kept?

A. I don't know. I didn't look through them.

Q. Well, take a hurried look.

A. All right.

Mr. Freeman: I am sorry. I understood that you were ready. I would not have taken the court's time.

The Witness: I haven't looked through these papers in ten years, at least, or thirteen, rather. It has been thirteen years since they were put in this envelope.

The Court: Have you been home, Mr. Portner?

The Witness: Yes, sir, I have, Judge. I would like to make a statement regarding this envelope, if I may. This envelope originally contained all of the material bills pertaining to this building and its equipment. There was no effort to file this away for safekeeping. It was just tossed around the place and, frankly, I didn't even

669 know we still had it until Mr. Black questioned the existence maybe of some records, and I happened to think that I had put the bills for the building in an envelope and they might still be somewhere, and last night I looked around and located this all dust-covered on a top shelf in a closet where we keep our literature and circulars, and I pulled it down and brushed the dust off of it. I haven't had time to look it over and see what it contains. It may or may not contain all of the documents that were in it originally. I don't know. It might also have some that do not pertain to the building in it. It might have gotten into it in the meantime. I think not, Mr. Freeman.

The Court: Where did you get the envelope today? Where was it?

The Witness: In my shop. Mr. Black asked for it last evening and I dug it out. I found it. I looked for it, not even knowing I had it yet. Mr. Black looked through it and took out the three invoices he presented here this morning.

The Court: Did you go home to get it?

The Witness: Yes, I did. Yes, sir.

The Court: How did you come back?

The Witness: On the electric. Went out on the electric and came back on the electric.

670 The Court: And you haven't looked at it since you picked it up out there?

The Witness: No, I haven't.

The Court: We will let this gentleman—

Mr. Freeman: I think he has answered that question.

The Court: What?

Mr. Freeman: Q. Didn't you say there is no Time-O-Stat Controls?

A. I think not. I am nearly through it now.

Q. You are about through?

A. Yes. I think not.

Q. Now, this morning I understood you to say that you didn't have any invoice for the oil burner in the envelope.

A. Yes, there was an invoice in the envelope for an oil burner, but it is not the one that is installed in the building. Apparently we threw a billing in the envelope representing the amount the burner cost, but it specifies the serial number is not the burner that is installed there.

Q. I understood you to say just a minute ago that you did not look in the envelope.

A. I saw that last night. Mr. Black pulled that out last night and we checked the serial number, and it was not the right one, so it was put on my desk and I put it

671 back in again, because it was part of the papers in the envelope.

Q. Then are you telling us now that you did not go through the envelope last evening?

A. I did not. Mr. Black went through the envelope while I was out in the back room talking to you and the gentlemen.

Q. And Mr. Black did pull out an oil burner invoice from the envelope?

A. Yes. It is now in there again where it belongs.

Q. I am sorry, Mr. Portner. I do not want you to be belligerant. I am just trying to get the facts.

A. That is perfectly all right. Just go ahead.

Q. Let us just take it as easy as possible here.

A. All right.

Q. I am just trying to get at the facts.

A. That is all I want to give.

Q. There is nothing personal about it.

A. O. K.

Q. Now, you are telling me that the envelope contains an oil burner invoice?

A. Yes, sir.

Q. And you are telling me now that that oil burner invoice is not the oil burner invoice for the oil burner in
672 your installation?

A. That is what I am telling you, yes, sir.

Q. And when did you find out that the invoice in the envelope was not applicable to the oil burner in the installation?

A. Last evening.

Q. And how did you so find out?

A. Mr. Black called it to my attention.

Q. How did Mr. Black know that it was not the invoice applicable to the burner on the job?

A. He checked the invoice against the serial number on the burner.

Q. So then you do have an invoice for the burner in an envelope where you kept all of your records with respect to costs of the building?

A. Yes, sir.

Q. Which you now say differs, speaking of the invoice, from the actual installation?

A. I don't think that it differs, no, not from my point of view. It may from yours. It is identicaly the same model of burner, identically the same price we used to buy burners, four, five, six, eight at a crack. It would be immaterial which invoice I kept for the burner installed in
the building, to present the price of the burner, so far
673 as my records are concerned.

Q. And when you bought oil burners six at a crack, did you get six invoices, or one invoice?

A. Always one separately. They were all invoiced separately, that was the practice.

Q. And it made no difference to you, for the purpose of the record, whether you kept the serial number corresponding to the burner?

A. It made no difference.

Q. None whatever?

A. None; not any.

Q. Then as a matter of fact, instead of keeping the invoice, you could just as well have taken the amount of dollars?

A. That is right.

Q. It would have been the same thing?

A. The same thing.

Q. Now, do you recall the serial number on the oil burner in your installation since it was checked last night?

A. I do not.

Q. By yourself and Mr. Black?

A. I do not.

Mr. Freeman: I wonder if Mr. Black might now give us the serial number that now appears on the oil burner?

674 Mr. Black: I do not know what it is, Mr. Freeman. I may state that upon viewing the invoice of the oil burner, I presumed that it was the one that covered the burner on the boiler in the plant, and Mr. Courteol checked the serial number and it was through him that I learned that they were not the same.

Mr. Freeman: Q. Will you give me the serial number, then, Mr. Portner, of the oil burner for which you have an invoice in your envelope?

A. 15776.

Q. And what is the date of the invoice for the oil burner?

A. 12/18/28.

Q. Do you know whether or not the serial number on the oil burner in your place of business is higher or later than the serial number appearing on the invoice that you have dated sometime in December of 1928?

A. I do not know, sir.

Mr. Freeman: I am wondering if either Mr. Black or Mr. Courteol could help me out in that respect.

Mr. Courteol: I will answer the question in this manner, and I was present at the time Mr. Black was looking over these records, which, incidentally, Mr. Portner had tossed to him in an envelope. I noted the number on
675 the burner invoice and walked back to the Electrol burner itself and noted that it was not the same number, although if I remember correctly, it was within a thousand one way or the other of the number shown on the envelope invoice. I would prefer to have that checked rather than to have you take my word of memory, because the record, the number is available out there, and I am sure it could be ascertained in very quick order.

Mr. Freeman: Q. If you get six burners at the same time from the Electrol, you do not get burners with serial numbers a thousand apart, do you?

A. I don't know. I never paid any attention to serial numbers. We never kept any records of them, or even noticed them. We had no reason or occasion for doing so.

Q. You never check the stuff that comes into your place of business against the invoices or shipping instructions?

A. Yes, but not serial numbers, because we are not interested in the serial numbers, except on occasions where we sell on an installment contract we will then check the serial number in that particular installation and put them on the installment contract for that type of equipment covered by that contract. Otherwise we pay no attention to them whatever at any time.

Q. And if anything goes wrong with the oil burner,
676 and you having been a practical man know that they do, do you ever refer to the serial number so that the company might know which oil burner you are talking about?

A. We might, if the serial number was considered by us to be critical, but we would take the number off the particular burner we were talking about.

Q. Are you telling us now that the oil burner, except for the removal of the safety device, that you now have in your place of business, is the same oil burner as originally put in, as you have stated, sometime in January, possibly, of 1929?

A. Yes, sir.

Q. Or December of 1928?

A. Yes, sir.

Q. Has there been any service work done on that oil burner?

A. It has been maintained, checked, probably a new nozzle or new ignition points, or things of that kind have had to be done from time to time to maintain it.

Q. Parts may have been replaced?

A. That is correct.

Q. You do not recall when the safety control was removed from the oil burner?

A. Not exactly, I don't, no.

677 Q. You would not?

A. I would know approximately, five or six years ago.

Q. Five or six years ago?

A. Something like that, yes. I am just guessing, but that would be my best recollection.

Q. Was that while Mr. Hill was still in your employ, or after?

A. I think so. I am not certain of that, however, Mr. Freeman.

Q. Who did the service work on the oil burner itself?

A. I venture to say that at least six or seven have serviced it at different times since it has been installed.

Q. And have you had any control in this installation go wrong?

A. No, nothing except the safety shunt control.

Q. And in the Time-O-Stat controls as well as the Mercoid No. 71 they have worked O. K. from the time they were put in up to date?

A. Absolutely perfect, yes, sir.

Q. And the two thermostats are today in the same condition they were when you put them in in January of 1929?

A. No, the one in the front room has been supplemented.

Q. And you have heard Mr. Hill so testify?

A. I did not. I did not hear any of Mr. Hill's testi-
678 mony, not one word of it.

Q. Will you tell us about this so-called supplemented thing with respect to the thermostat in the front room?

A. Yes. We found the thermostat had too great a range. There was no heat retaining ability to that type of radiation and the air stratified quite rapidly. Consequently we got too great a fluctuation of temperature at the floor line or breathing line, the body line in the building, before the burner would return to heating. So we supplemented the room heat by an auxiliary heating element in the proximity of the actuating element of the thermostat to accelerate the closing of the thermostat or cause it to close earlier than it would have if left normally.

Q. And when did you put in this supplemental device in the front room thermostat?

A. Well, as I remember it now, the very first winter, before that winter was over, we got complaints from the bookkeeper especially that her legs got fearfully cold from stratification, and as I remember now, I immediately got into it, and I will admit it was purely experimental, but it worked.

Q. You knew of heat anticipation for thermostats?

A. No; never heard of it.

679 Q. And have you heard the term "cold 70" used?

A. No, not at that time. Later, plenty of times.

Q. Where did you get the heater coil that you used in the front thermostat?

A. I asked Mr. McCabe for it and he gave it to me.

Q. So Mr. McCabe knew then about your particular installation?

A. He knew about the installation. I don't know if he knew what I was going to do with his heater element. I asked him for one, was all. I don't know that I told him what I was going to use it for. Maybe I did. I can't remember.

Q. Did you tell him that you were going to use it in connection with a room thermostat or not?

A. I don't know whether I did or not.

Q. In order to anticipate the action of the thermostat or not?

A. I don't know whether I did or not.

Q. And who installed the supplemental device?

A. I did, personally.

Q. And just what did you do in order to install it?

A. Put it in series with the oil burner—now, wait a minute. I have to think a second. I haven't looked at it for a long time. Yes, we put that in series with the 680 oil burner motor.

Q. When the thermostat was—

A. No, now, wait a minute.

Q. The auxiliary heat was on?

A. Yes. What we were doing—I must change my testimony a bit there, because it has been a long time since I thought about this thing. What we were doing was causing the burner to shut down earlier rather than to cut in earlier. In other words, the heating element heats the thermostat during the running period, causing it to cut out quicker without an overrun of temperature. I have to correct that. It has been a long time since I have thought about it. It accomplishes the same thing as it does the other way.

Q. And your best recollection now is that the thermostat was changed during the first year?

A. That is as I remember it. I believe that is true.

Q. Now, has there been any other change in any of the instrumentalities which we now find upon the photograph or photographs Exhibits MMM-1 to 4, inclusive?

A. Not a single detail, Mr. Freeman, that I can recall or think of.

Q. Did you at any time look inside of the Time-O-Stat controls that are on the job?

681 A. Well, of course, they were open when they were being checked. I don't know that I took any trouble

to look inside of one of them any more than to make the connections or see that they were made, and I can't remember when the covers have ever been off of them since. They may have been, but I can't remember it.

Q. The covers were off last night?

A. Last night, yes, that is true.

Q. And did you notice any code markings when you were installing these controls, do you recall?

A. Not a thing, no, sir.

Q. You did remove the cover when the controls were installed?

A. Naturally, yes, sir.

Q. That is necessary in order to connect them up?

A. As I remember it, I think so. I think we connected the binding screws in there, and I believe it is necessary to open the front cover. I haven't had the cover off one in years, so I am not certain of that.

Q. So we have it of record, you are telling us now that you did not see any markings on the inside of any of these three Time-O-Stat controls, which markings consist of the letters and figures as follows: B-30-LO, and C-30-LO.

682 A. I did not.

Q. And you are telling us that the Time-O-Stat controls were all in exactly as they are today, as early as January of 1929?

A. Yes, sir.

Q. Now, that is January of 1929?

A. Yes, sure. I have told you that several times now, and I mean it, see.

Q. Now, so that I get it from you, tell me when, giving us as accurately as you can, the first date when the installation was complete in its present form except for the supplemental device that you put on the room thermostat.

A. I will have to do that from memory. I would say February 1st, that it would be in complete and finished operation. That might be a little off, but I am not certain.

Q. Now, tell us when, and give us again accurately, the first time the installation included the three Time-O-Stat controls that are now on the job.

A. I would say before February 1st. That is as close as I want to define it, because I am not certain of the exact date.

The Court: What year?

683 The Witness: 1939.

Mr. Freeman: 1929.

The Witness: 1929, excuse me.

Mr. Freeman: Q. Do you know whether or not any of the controls were ever removed from your installation and taken out and used as temporary controls in homes where service was required?

A. Not to my knowledge. It would have been possible if I were not present.

Q. Does your company, or your establishment, operate on the basis of removing some of your own controls and taking them out so that they may give service to your customers during emergencies?

A. We would do that in an emergency, yes, sir, if we found it necessary.

Q. So that any one of these Time-O-Stat controls might have been removed at one time or another? ?

A. It is possible. I cannot watch them day and night, understand, see. I leave . en alone for a day or a week or even a month at a time, when I take a vacation, and I don't know what happens when I am gone, if it all looks the same to me when I come back. I know nothing.

Q. Well, all Time-O-Stat controls of the type 56 look alike, don't they?

684 A. They should, if they are the same model number.

Q. I am predicating my question that it is the same model.

A. I have never seen them all, Mr. Freeman. I am talking about the same model. All that I have ever seen looked alike.

Q. And all of the aquastats model No. 56 were all alike?

A. I would assume they were.

Q. All that you saw bearing the notation No. 56?

A. Yes.

Q. Were alike?

A. That is right.

Q. Now, when you put in the installation and operated it manually, you then employed only, as I understand it, the Figure 71?

A. Yes, a hand operated switch, in case we wanted to shut it down entirely.

Q. And you did have in your place of business, did you not, ordinary thermostats?

A. Yes, we always have them.

Q. Just the conventional thermostats?

A. Certainly.

Q. And in place of a hand switch to start and stop

685 the operation of the system you could have connected in just the ordinary conventional thermostat and thus gotten automatic operation?

A. We could have done it, yes, sir. We did not find it necessary.

Q. But you did not do that?

A. We did not find it necessary to do that.

Q. Did the fans continue to run permanently?

A. They ran all the time, unless shut off individually or both of them by hand.

Q. And what kind of connections did you use to shut them off by hand?

A. We just twisted the wires together hot and disconnected them when we wanted to shut them down. Everything was very temporary. We wanted temporary heat during construction.

Q. And what did you do at night when you left the place?

A. At the time they were operating that way they ran constantly all night. We had a sub-zero streak of weather, as I remember it, sixteen days straight all day and night below zero.

Q. And you could have put in the ordinary thermostats which would have least given you automatic operation,
686 so that if the place was above 72 or the necessary temperature, the fan would have gone on?

A. I could have done so, yes.

Q. But you did not do it?

A. No.

Q. You did all of that mechanically or manually?

A. Yes.

Q. By connecting up the wires?

A. That is right.

Q. You did not even go to the trouble of providing an ordinary hand switch?

A. No.

Q. And you did have hand switches for breaking circuits in your stock?

A. Yes, sure.

Q. And you did have the ordinary conventional room thermostats in stock?

A. Yes.

Q. That is correct, is it not?

A. Yes.

Q. And you could have used the ordinary thermostat

to either control the operation of the burner or you could have used the conventional thermostat to control either one of the two unit heaters, could you not?

687 A. Yes.

Q. And yet you wrote to the Mercoid Corporation on the 19th of January, 1929, and said you were in a hurry to get your controls. You could have gotten service, and rather good service, by use of three room thermostats of the conventional kind, which you had in your place of business at that time?

A. You are making a statement or asking me a question?

Q. I am asking you a question.

A. What is it you want to know?

Q. I am asking you whether or not you could not have taken three of the conventional thermostats and connected them up temporarily, at least, to get operation of your heater system in an automatic way as distinguished from your way of wrapping two wires together when you wanted something to happen and disconnecting those wires when you wanted something not to happen?

A. It could have been done. The operation would not have been satisfactory.

Q. It would have been as satisfactory, though, as the manually connecting up live wires, wouldn't it?

A. More so, yes.

Q. It would have been better?

A. Yes.

688 Q. And you had the wherewithal—by wherewithal, I mean you had the conventional thermostats that you could have used for that job?

A. Certainly.

Q. But you did not use them?

A. No.

Q. And you suffered along with the manual operation of your system as late as January 19, 1929, is that correct?

A. I would not say we suffered. Your statement is wrong. We had very adequate heat when we wanted it, and the way we wanted it.

Q. And you got adequate heat even when you did not need it, didn't you?

A. To some extent that is true.

Q. And the room thermostats that you had available, if put into the line, would have given you automatic operation, wouldn't they?

A. Yes. If it had been worth while, we would have done it. The extra operation was not worthwhile to us, Mr. Freeman, so we did not care to do it.

Q. What was the extra operation you speak of?

A. The operation was to dry the building out. It was all wringing wet. It was a brand new building. We wanted plenty of heat, lots of heat, throw it away, plenty of it
689 and heavy.

Q. And you could have done that by connecting up these conventional thermostats?

A. Yes, but that would be entirely unnecessary work, just so much lost money.

Q. What do you mean by lost money?

A. The work of connecting up the thermostats would have been a total loss, it would have been lost work. It would not have accomplished anything or be worth anything to us.

Q. Just how much work is there in connecting up a temporary thermostat?

A. Just how much work?

Q. Yes.

A. You would have had to jangle a lot of wires around in the way of the workmen and all of that, to get these various wires to connect them up. There is no partition set in this building or anything else when it is manually operated. There is just one great big room. All we wanted was lots of heat. We didn't care how we got it. We wanted it the quickest, cheapest and best way we could get it in a hurry and lots of it.

Q. So you had these wires jangling loose at one time?

A. Even hanging on nails.

690 Q. All put together?

A. Even hanging on nails or anything else around the place, any old thing, to get them out from under foot.

Q. You just connected these wires up loose?

A. That is right.

Q. Did you go to the trouble of taping them when you wanted to connect them up?

A. No, we did not, because when we wanted to shut a fan down we just untwisted it.

Q. And you left the ends of the live wires bare?

A. Yes. I think we left one main switch down, with the burner and fan, we left one switch down. If we wanted to shut individual fans down or the burner down, we simply untwisted the wire.

Q. And how long did you say that that type of operation continued?

A. I would say the best part of a month.

Q. Up to about January 30, 1929?

A. Somewhere in that neighborhood, or a week earlier than that, maybe. I may have started the last week in December.

Q. 1928?

A. Yes, that is possible, too.

Q. Now, I understand you to say that you had the 691 Time-O-Stat controls in stock?

A. I told you they were either in our stock or they were arrived for stock and may have arrived at least on the day they were installed. I have no way of knowing.

Q. They must have arrived prior to the time that the Mercoid items arrived or you would have used the three Risertherms which were sent to you?

A. You are assuming—

Q. About January 19, 1929?

A. You are assuming that. I am not agreeing with you. I may still have used the controls I did, even with the Mercoids on hand. Those are details I do not remember distinctly, thirteen years ago.

Q. But you do remember definitely never having used the Mercoid Figure 35 Risertherms which were sent to you in January, 1939?

A. They were never used on this job.

Q. That is what we are talking about.

A. Yes.

Q. On this installation.

A. Never.

Q. And the only controls for controlling the operation of the furnace with respect to the unit heaters were those that you now have on the job?

692 A. Yes, sir.

Q. And the only kind that were ever used were those made by the Time-O-Stat Controls Company?

A. Yes, sir.

Q. Who did the electric wiring, that is, the electrical work for this installation?

A. I am not certain of that. We had two or three men around the place. They probably all had a hand in it. But I think Charles Hill did the main part of it and the most of it. That is quite likely.

Q. And who connected up the controls, that is, did the

physical work of applying the controls to the installation?

A. I think he did.

Q. And by "he," you mean Mr. Hill?

A. That is right. I think so, as I recollect.

Q. But your memory is very definite that you were the one that put on the supplemental heater on the room thermostat?

A. Yes, sir.

Q. Mr. Hill did not have anything to do with that?

A. I don't think so, no. He may not have even known it.

Q. He knew it was there.

A. I don't know that. I don't know whether he did
693 or not. And he may have been present when I put it on.

Q. I am sorry you did not look through your envelope, because I not only asked you with respect to the Time-O-Stat controls invoices, but I asked you this morning for any and all invoices that had to do with any of the makeup of the heating plant or heating installation which has been under discussion here all day, but apparently you have not as yet looked through the envelope.

A. Yes, I looked through it right before your eyes a bit ago. I told you there was no such invoice in there.

Q. No, I asked you not only with respect to Time-O-Stat Controls invoices, but I asked you with respect to any other invoices that had to do in any way with any of the apparatus which now forms a part of the heating system in your place of business.

A. When did you ask me for those?

Q. I asked you for that this morning.

A. I brought up everything that we have in our place of business, to my knowledge, it is right here.

Mr. Freeman: Your Honor, I wonder if we might have about a five-minute recess, to let Mr. Portner look through his papers?

The Court: Yes, we will take a short recess.

The Witness: What am I to look for?

694 Mr. Freeman: For any and all invoices or records of any kind that you have which in any way are directed to the subject matter of your heating plant.

The Witness: O. K.

The Court: We will have a short recess.

(A short recess was here had, after which the proceedings were resumed as follows:)

The Court: Proceed.

Mr. Freeman: Q. You were asked shortly before the recess about invoices that have something to do with the installation. Have you now had an opportunity to check the envelope with the documents?

A. Yes, sir.

Q. Will you briefly refer to those instruments or documents that you have dug up?

A. Well, I have two invoices here from the McMaster-Carr Supply covering iron pipe and fittings, a water tank, and sundry material that went into the connecting of the boiler and radiators, and also included in this is plumbing material, which is of a similar nature.

Q. And are you telling us now that all of the items appearing upon the McMaster-Carr Supply Company's invoice went into the heating installation?

A. No, I am not telling you that. We may have
695 taken some of it out of our stock and we may have put some of it in stock to replace other items. I would say generally that all of it went in, because some of it in particular was bought especially for the job. The others were standard stock items with us.

Q. So that putting these invoices of the McMaster-Carr Supply Company in the envelope did not necessarily give you any information with respect to the cost of your building, did it?

A. Not to the penny. It was near enough for our purpose.

Q. And some of the materials used in your building which came out of stock items which appear upon the McMaster-Carr Supply Company invoice went into the building and part of it went into stock?

A. Yes. I would not know how much, without analyzing it. Maybe none of it did. I am not certain of the detail items, as I cannot remember thirteen years ago. I can identify some of them as going specifically into the building.

Q. Now, will you tell us about the next item you find there?

A. Here is one from Bell & Gossett Company, which covers the indirect water heater installed in combination
696 with the boiler. There is one from Chicago Steel Tank Company for a thousand gallon steel underground fuel oil tank connected with the burner.

There was one from Graybar Electric Company, covering electrical material for the entire building, which may

or may not be complete, because we had materials in stock also, and included in this material undoubtedly is the material that connected up those controls and the burner, or part of it at least.

There is a bill from Electrol, Incorporated, for the oil burner or an oil burner.

Q. For an oil burner?

A. For an oil burner, yes.

Q. May I see the Electrol invoice?

A. You may see it. And besides that I have two freight bills here covering transportation or cartage on this material.

Q. Will you tell me about this Electrol invoice, especially that portion of the invoice that refers to one model TY Electrol?

A. TJ, is it not?

Q. TY, with Protectostat for experimental purposes. What was the—

A. TY? Well, the TY burner is the TJ burner with an experimental type Protectostat, and they did ship me, as I remember it, three of them for experimental work and report. The price was identically the same as the one
697 with our standard or regular type of Protectostat. We did a good deal of experimental work for those people and also for some of the control people.

Q. Did you have any of your business connections with Electrol with a Mr. Newcomb?

A. I did not know him personally at all. I knew Mr. Scott.

Q. Did you know Mr. Louis L. Scott of that company?

A. Yes, very well, quite well.

Q. Now, you have produced all of the invoices that you have with respect to the present installation?

A. Yes.

Mr. Freeman: That is all.

Redirect Examination by Mr. Moore.

Q. Mr. Portner, does the heating system that you have installed at the present time in your place of business operate in the same sequence of operation as that heating system you originally installed some time prior to February, 1929?

A. Yes, sir.

Q. In every respect?

A. In every respect, yes.

Q. So it would not make any difference then—

A. Except the heat anticipator in the one thermo-
698 stat which I supplemented.

Q. It does not make any difference then if one of your service men while you are out of town answering an emergency call would take one of the controls from your heating system and put it in a customer's home and then later put it back or a similar control in your heating system, does it?

Mr. Freeman: That is objected to as leading.

The Court: Sustained.

Mr. Moore: Q. You stated that your service man or one of your service men, while you were away, might possibly have removed one of the controls from your heating system. Now, did you notice when you returned that any of the controls had been removed?

A. Any such action, should it have taken place, is absolutely unknown to me. I only suggested the possibility of such a thing happening, because I could not sit down and watch those controls for thirteen years. There are things that could happen possibly, improbably, and if they did happen it is entirely unknown to me.

Q. Then for the past thirteen years this heating system has operated in the same sequence of operation as you originally described yesterday?

A. Yes, sir.

699 Mr. Freeman: Objected to as leading.

The Court: Sustained. He is still your witness, you know, even though he is on redirect.

Mr. Moore: Q. You stated the sequence of operation of the controls of this heating system as you originally installed it, did you not, yesterday?

A. I did not get that question, Mr. Moore.

Q. I say you described to the court here the sequence of operation of your heating system as it was originally installed?

A. Yes, sir.

Q. You did that yesterday?

A. Yes, sir.

Q. You state now that it operates in the same manner today as it did then?

Mr. Freeman: Objected to as leading.

The Court: Sustained.

Mr. Moore: Q. Is there any difference in the operation?
Mr. Freeman: Objection.
The Court: You are leading him. He is your witness.
Mr. Moore: I know.
Q. That same sequence of operation—
Mr. Freeman: Objected to.
The Court: You are going into conjecture. You
700 proceed to examine him on redirect.
Mr. Moore: That is the only thing I want to bring out.
Q. I believe you already stated that the sequence of operation—
Mr. Freeman: Can't you ask a question, Mr. Moore, without telling him what you want him to say? That is objected to as leading, your Honor.
Mr. Moore: Q. Will you step down here and explain the operation of your control system as it operates today?
A. Yes, I can do that.
The Court: Didn't he do that the other day?
Mr. Freeman: I thought he did that yesterday. I object to that as repetition.
The Court: I thought he did it. He said he did it yesterday.
Mr. Moore: Q. The operation that you described yesterday was the operation as you originally installed it, was it not?
Mr. Freeman: Objected to as leading.
The Court: Sustained.
Mr. Moore: Q. What did you testify to yesterday?
Mr. Freeman: The record shows what he testified to yesterday.
701 The Court: We might as well end this up some way. What is it you want him to tell you?
Mr. Moore: I am just asking whether it has been operating the same way for the last thirteen years.
The Court: The same way?
Mr. Moore: The same way.
The Court: Q. You know it does, does it?
A. Yes, sir.
Mr. Moore: Redirect closed.
Mr. Freeman: That is all.

702 CHARLES HILL, called as a witness on behalf of the complainant, being first duly sworn, testified as follows:

Direct Examination by Mr. Moore.

Q. Will you please state your name?
A. Charles Hill.
Q. Your age?
A. Thirty-seven.
Q. Your residence?
A. West Chicago.
Q. And what is your occupation?
A. Service man, maintenance work and electrical repair work.
Q. Can you speak a little louder, please?
A. Service man on maintenance and on electrical repair service.
Q. Maintenance of what?
A. And installing controls on oil burners and stokers.
Q. How long have you been engaged in that business?
A. About fifteen years.
Q. Who are you working for now?
A. Myself.
703 Q. How long have you been working for yourself?
A. Six years.
Q. Who were you employed by before that time?
A. J. A. Portner.
Q. Is that the Mr. J. A. Portner who was just on the stand?
A. That is right.
Q. How long had you been employed by him, do you remember?
A. About nine years.
Q. When you first entered his employ was he located in Wheaton, on Front Street?
A. No, sir. He was at 901 North Wheaton Avenue.
Q. Do you remember when he moved to 225 West Front Street?
A. About two years after I started working for him.
Q. Was that a new building?
A. Yes, sir.
Q. Who put the building up, do you know?
A. Mr. Portner did himself.

Q. Did you install or assist Mr. Portner in installing heating systems?

A. Yes, sir.

Q. Before he moved into this new place?

704 A. Yes, sir, I did.

Q. Hot water systems?

A. Yes, sir.

Q. Steam systems?

A. Yes, sir.

Q. Hot water systems, you say?

A. Yes, sir.

Q. Were you familiar with the various controls?

A. Yes, sir.

Q. Used on those systems?

A. Yes, sir, I was.

Q. What did Mr. Portner use as a heating system when he moved into his new place, if you remember?

A. He used steam.

Q. And he used certain controls, did he not?

A. Yes.

Q. Who made this installation in Mr. Portner's news place?

A. I did, and Mr. Portner.

Q. You and Mr. Portner put in the various controls?

A. That is right.

Q. That he has referred to?

A. That is right.

Q. Now, he has referred to two thermostats. By 705 the way, do you read wiring diagrams?

A. Yes.

Q. How long have you been reading wiring diagrams?

A. Oh, fifteen years.

Q. Now, referring to this wiring diagram of Mr. Portner, the enlarged photostat Mercoid Exhibit JJJ-1, Mr. Portner testified that he used two Mercoid room thermostats.

A. Yes, sir.

Mr. Freeman: We object to that line of examination. As long as you have asked him that question, ask him to read it. Don't tell him that somebody testified there were two thermostats there. We object to that type of examination as leading.

The Court: Sustained.

Mr. Moore: Q. You stated that you and Mr. Portner installed the controls?

A. Yes, sir.

Q. Can you come down here and point out to the court what controls you installed? There is also a large picture that was taken of his place.

A. These two thermostats we installed (indicating on exhibit) and a number of controls. I do not know the number. I could explain the steam pressure control we installed there.

706 Q. And where is that shown on the photograph?

A. That is this control right here (indicating on exhibit).

Mr. Freeman: Now are you asking him about the photograph? I thought you were directing his attention to reading a circuit drawing. Anybody can look at a photograph and tell what it is. I would like to have him describe the circuit drawing.

Mr. Moore: Q. Mr. Hill, have you seen that wiring diagram before?

A. I do not remember. I probably did at the time. I do not remember it.

Q. To the best of your ability, then, can you explain to the court what that wiring diagram represents?

A. It represents an oil burner control system, two thermostats, low water steam pressure control and also an indirect water heater control.

Q. Any other control?

A. Safety controls on the oil burner.

Q. What are those two round circles at the top of the drawing?

A. Those were the controls we used on the unit heaters.

Q. And what are those round circles numbered 35?

A. Those are the controls that operate the unit heaters.

707 Q. Now, I believe you stated you assisted Mr. Portner in making this installation.

A. That is right, I did.

Q. And that you put those various controls on the installation?

A. I did.

Q. Now, can you refer to this enlarged photograph and point out the room thermostat that you referred to?

A. Right here (indicating on exhibit).

Q. And what kind of a thermostat was that?

A. A two mercury tube Mercoid control.

Q. How many tubes did it have on it?

A. Two.

Q. What are those round number 35's that you said were the controls for the unit heaters?

A. Those are the Time-O-Stat clamp-on controls.

Q. And where is the control which corresponds to the No. 612 on the wiring diagram, where do you find that in the photograph?

A. 612 is the pressure switch.

Q. And who made the pressure switch, if you remember?

A. The Mercoid Corporation.

Q. The pressure switch was made by the Mercoid Corporation?

708 A. That is right.

Q. The room thermostats with the two tubes were made by the Mercoid Corporation?

A. By the Mercoid Corporation.

Q. And what were the two other controls?

A. They were Time-O-Stat controls.

Q. Do you know who made them?

A. No, I do not. I do not recall.

Q. You stated that you assisted Mr. Portner in putting these controls on his heating system?

A. I did.

Q. Now, do you remember when you did that?

A. No, I don't remember. It was before he moved into his new place of business. He hooked up the controls and boiler and everything before it went into operation in his new place of business.

Q. Did he have the whole control system hooked up before he moved into his new place of business or did you put them on while he was doing business there?

A. We put them on while he was doing business there.

Q. Do you recall his having an opening?

A. Yes, I do.

Q. Were these in operation at the time or before the opening?

709 A. Yes, they were.

Q. Have you looked at this installation recently?

A. Yes, sir, I have.

Q. How long ago?

A. About four weeks ago.

Q. After the time you left Mr. Portner and went out in business for yourself did you have any occasion to visit his place of business?

A. Yes, sir, I did.

Q. About how many times?

A. Oh, I should say three times a month, something like that.

Q. What was your purpose in going there three times a month?

A. To get repair parts.

Q. He had them in stock, did he?

A. Yes, sir, he did.

Q. Did you have any occasion, after you left his place of business, to check on these controls, to see whether they were the same as the ones you say you put on yourself?

A. Nothing, only as I was back in the shop I could see the layout was the same as I had installed there.

Q. Was the system operating when you were out there?

A. Yes, it was.

710 Q. What happened when the pressure got too high in the boiler?

A. The pressure control on the boiler would cut off the oil burner.

Q. The oil burner would stop?

A. Yes, sir.

Q. If the unit controls were operating when the oil burner stopped, what happened to them?

A. They would continue to operate until such time as the thermostat shut off.

Q. Have you been there when the thermostat shut off the fan?

A. Yes, sir.

Q. And shut off the oil burner?

A. Yes, sir.

Q. You have not checked up on each one of these controls recently to see whether or not they are the same controls that you put in?

A. No, I would not have any reason to.

Q. Did you ever have any reason to remove any of the controls that you first put on?

A. Here recently or before?

Q. No, when you were working there?

711 A. When I was working there for him?

Q. Yes.

A. That I would not remember. We may have changed some of them. That I would not remember.

Q. You say they are the same?

A. Yes, they are the same controls in appearance and everything else.

Q. In appearance and operation?

A. Yes.

Q. And all that?

A. Yes.

Q. As you remember you put on first?

A. Yes.

Mr. Moore: Direct examination completed.

The Court: I would like to tell you gentlemen that a meeting of the judges of this court has been called for 12:00 o'clock. I will have to ask you to recess at that time until 2:00.

Mr. Moore: Very well, your Honor.

Cross-Examination by Mr. Freeman.

Q. You do recall the use of Time-O-Stat controls in the installation at Wheaton, that is, the Portner installation?

A. Will you repeat that question, please?

712 Mr. Freeman: Will you kindly read it, Mr. Reporter?

(Mr. Freeman's last question was read by the reporter as above recorded.)

The Witness: A. Yes, sir, I do.

Mr. Freeman: Q. And you recall the use of those Time-O-Stat controls right at the beginning, that is, there were never any other controls used in place of the Time-O-Stat controls?

A. Not that I remember, we did not use any other.

Q. Did you personally install the Time-O-Stat controls?

A. As I remember, I did, with the help of Mr. Portner?

Q. When you last inspected the installation, about four weeks ago, did you check the various controls to see whether or not you might identify them as the controls which you put on and which were in use prior to the formal opening of the Portner establishment along in February or March of 1929?

A. I was not there to inspect the controls. I was there to buy parts, and, as I noticed, the hook-up and everything there had not been changed. Whether he changed controls in the last six years, that I would not know.

Q. When did you talk to Mr. Portner or to anyone else with respect to your possibility of being a witness with

713 respect to your work in connection with the Portner installation?

A. That was probably a month or so ago.

Q. And with whom did you talk then?

A. Mr. Black.

Q. At the installation or out at the Portner place of business?

A. No, I did not talk to him there. He came to my house.

Q. Then did you go over and look at the installation?

A. No, sir, I did not.

Q. When did you last take a good look at the installation?

A. That I would not remember.

Q. So that you are now testifying solely from memory as to the controls that you put in?

A. That is right.

Q. You have used in other installations controls made by the Time-O-Stat Controls Company?

A. That I would not remember.

Q. But you do remember using Time-O-Stat controls on this job?

A. Yes, sir.

Q. And you have used other Mercoid controls in 714 other installations?

A. That is right.

Q. And you recall in other installations in the heating field where you used a portion of the controls made by one company and another portion of the controls made by still another control company?

A. That is possible that we did.

Q. Do you recall definitely now?

A. No, I would not recall that.

Q. In other words, you do not recall now on other installations where different manufacturers made the controls used in the installations?

A. That I would not have any reason to remember, because I just hooked them up according to what Mr. Portner told me and used the controls.

Q. But in this case your memory is rather definite, that you used Time-O-Stat controls for part of the hook-up and you used Mercoid controls for another part of the hook-up?

A. Yes; I do remember that.

Q. Although you have no such memory with respect to any other of your installations?

A. As far as other installations are concerned, yes, I do. If you take each individual installation, I would.

715 Q. Is it independent memory or is it the memory that comes back to you when you go out and look at a given installation?

A. That is right, it comes to me.

Q. But independently you have no way of knowing whether the Time-O-Stat controls and the Mercoid controls were on that job when you put them in, as you now say?

A. I remember that, because I definitely worked right around these controls all the time. Our shop is right at the boiler there.

Q. Do you recall now whether you obtained the Time-O-Stat controls from stock or whether they were shipped in? You understand what I mean by taking them from stock rather than going out and uncrating them?

A. That is right, we may have.

Q. I am trying to find out what you remember, as to where you got the Time-O-Stat controls?

A. I suppose he got them from the control company.

Q. No, I mean when the controls were sent out to your company; they may go in stock.

A. That is right.

Q. And when they go in stock they are put on shelves.

A. That is right.

716 Q. I am now asking you whether you got these controls for this job from your shelves or whether you uncrated some box which was recently shipped in?

A. That I would not remember.

Q. Now, do you know whether or not the controls about which we are talking were at any time changed prior to your leaving Mr. Portner's employ?

A. They had not that I know of. As I say, I worked in the place and the hook-up and everything was the same when I worked for him.

Q. When you say hook-up, did you check the hook-up?

A. You mean, after I left Mr. Portner?

Q. Yes.

A. No, sir, I did not.

Q. And when did you leave Mr. Portner?

A. Six years ago.

Q. Now, prior to your having left Mr. Portner, so we go back to about 1936, from 1929 to 1936 do you know whether or not any of the controls were removed for any purpose whatsoever?

A. Not that I recall.
Q. You never removed any?
A. Not that I recall.
Q. Do you recall any work or service work with respect to any of the controls on the burner installation?
717 A. Would you repeat that question, please?
Mr. Freeman: I will have the reporter read it.
(Mr. Freeman's last question was read by the reporter as above recorded.)
The Witness: A. I do not understand your question.
Mr. Freeman: Q. Well, if I called you to my home to do service because our burner did not work, you would check the controls, would you not?
A. Yes, sir.
Q. Now, I am asking you whether at any time from 1929 to 1936 you did any service work in connection with these controls, took them off, looked at them, replaced parts or did any of the things which are normally done by a service man?
A. Sure, we may have. I would not remember doing it.
Q. I am asking you whether you ever removed any for any service work?
A. We may have. Sometimes we do that, take a control off and take it out on another job and use it temporarily until we get another control back.
Q. And was that a custom, even though somewhat an unusual custom, in your service plant, to take off a control from your own installation and use it in some one else's home?
718 A. Oh, yes, if we did not have one in stock we did that.
Q. So if some one was having trouble with a Mercoid Risertherm out in the field and you wanted one to cure that trouble, you might remove one from your own installation, take it out and use it in the field?
A. We may have.
Q. That was one of the things you did; not speaking specifically of the Risertherm, but it was part of your general work with Portner?
A. Yes.
Q. That is, removing controls, taking them out and using them in the field?
A. We did that, yes. If a customer could not get along without a control, we would take our control out. We could manually operate the plant.

719 Q. Did you have occasion to examine the two thermostats now in the Portner installation?

A. Not within the last six years.

Q. Can you state now whether the two thermostats are the same in so far as construction is concerned?

A. Yes, sir; yes, I can.

720 Q. Do you know what is meant by heat anticipation when used in connection with a room thermostat?

A. Heat anticipation?

Q. Yes.

A. It is the operation of the control.

Q. The use of the words "heat anticipation" in connection with the room thermostat?

A. I don't know just what you mean by that.

Q. Are you familiar with the type of thermostat wherein a small heater coil is energized when the room thermostat moves to closed circuit position to accelerate or anticipate the normal action of the thermostat?

A. Yes, sir.

Q. You understand?

A. I understand that, yes.

Q. Now, did either of the two room thermostats used in the Portner installation employ a small heater coil below one of the bellows members or the power element which caused the mercury tubes to swing from one position to the other?

A. That I do not remember. As I recall, we put on some power elements in there later on, as I recollect now.

Q. You do recollect now?

721 A. Yes.

Q. So that the thermostats used, at least at the time you left—

A. Yes.

Q. —were not the same thermostats?

A. Yes, they were the same thermostats.

Q. With additions?

A. Nothing that I know of, except I think there was a little power element. That I wouldn't remember. I think there was something we used in there.

Q. Do you remember now taking the thermostats as they came from the Mercoid Corporation and after they were installed and making some change in the structure of the thermostat—and when I use the term "change," I mean some addition added to the thermostat or thermostats?

A. It seems as if we did, but I wouldn't be sure.

Q. And you haven't had occasion then within the last six years to take a good look at either of the two thermostats?

A. No, I wouldn't have any occasion to.

Q. As a matter of fact then you do not know as of today whether or not each of the two thermostats employ two mercury tubes?

A. That I would be sure of, yes.

722 Q. You would be sure of that?

A. Yes, sir.

Q. Even though you had not seen the instruments for six years?

A. That is right.

Q. Now, as a matter of fact, if you removed one of the mercury tubes and left the thermostat otherwise just as it came from the factory—

A. That is right.

Q. You would not be able to tell by looking on the outside of the thermostat whether it was one or two?

A. You wouldn't that way, only through the operation of the heating plant you would.

Q. Might you not make and break the electric circuit made by one of the thermostats by some other thermostat if you wanted to substitute for one of the electrodes?

A. You could, but you wouldn't.

Q. Now, are you telling us what is a fact or what one might do?

A. I don't see any reason for him changing it.

Q. But if a change had been made within the last six years, you wouldn't know about it?

A. No, I wouldn't know about it.

Q. And you cannot tell me whether the thermostat

723 I have in my hand has two electrodes in it or one?

A. No.

Q. I use the term electrodes; I meant two switches, and you understood what I meant?

A. Yes. Yes, I understood.

Mr. Freeman: Mr. Moore, does this have any number, or exhibit number by which I might identify it?

Mr. Moore: No, it has not been introduced because it is one of the very few we have left. It is illustrated fully in the literature.

Mr. Freeman: And would you call that a figure—

Mr. Moore: 21,

Mr. Freeman: —21 thermostat?

Mr. Moore: Yes.

Mr. Freeman: Let the record show the witness was shown the thermostat here in the court room, the thermostat Figure 21 made by The Mercoid Corporation.

Mr. Moore: Yes.

Mr. Freeman: Q. By the way, how did the outside of the thermostat in appearance, or either of the two thermostats, in the Portner installation compare with the outside of the thermostat that you now see here in the court room, the Figure 21 thermostat?

A. The same thing.

724 Q. I call your attention to photograph MMM-1, and particularly the thermostat shown thereon, and will ask you to tell me whether or not there appears a small coil on the thermostat below the power element.

A. Yes, there is. Yes, there is a little coil there.

Q. Now, having had the heater coil or the small coil called to your attention, do you recall anything with respect to that coil as to when it was added to the thermostat?

A. No, I wouldn't remember. I remember putting it there but I don't remember the time it was put there.

Q. It was not part of the thermostat as received from The Mercoid Corporation?

A. No, it wasn't.

Q. And it was not anything that was standard with the Mercoid Corporation, as far as you know?

A. Not as far as I know.

Q. Now, will you look at the photograph MMM-4 and look at the other thermostat and tell me whether or not you see any such or similar coil thereon?

A. No, there is no coil there.

Q. So that the two thermostats, as we now have them in the court room installation, are not the same, is that correct?

725 A. They are not the same as far as the little heater coil in there. It is the same otherwise.

Q. In one case the heater coil does a job?

A. It only changes the differential of the thermostat. That is all it was put there for.

Q. And it was put there some time after the installation was in service?

A. That is probable.

Q. And you don't know whether it was put there a year after the installation was in service or five years after?

A. No, I don't.

Q. You have no memory at all?

A. No.
Q. Did you put it there?
A. That I wouldn't remember.
Q. Might you have put it there?
A. I might have.
Q. And that would require, would it not, connecting up the heater coil in the electric circuit?
A. Yes, it would.
Q. And that would require tapping into the wires leading into the thermostat?
A. That is right.
Q. Might it require the removal of the thermostat 726 from the wall?
A. Well, yes.
Q. It would require removing the thermostat from the wall?
A. It might.
Q. Now, with what I have called to your attention, does your memory at all recall any of the incidents with respect to the change made in the thermostat?
A. As I remember, speaking of it now, as I say, the little heater element was put in there to change the degrees in temperature. A lag that would make the control operate a little quicker.
Q. So that at least in that one respect, as far as you now are testifying, the instrumentalities are not exactly the same today as they were when the installation was first put in?
A. As far as the operation of it, I would say it was.
Q. Now, you spoke about lag, and that is a term generally used in the heating field?
A. Yes.
Q. Just what brought about this so-called lag that necessitated a change in the thermostat control?
A. Well, we got complaints of what they call a cold 70.
727 In other words, between the stop and start of any oil burner or equipment, and to try to make the thermostats a little more sensitive of kicking in and getting away from that cold 70.
Q. That little heater coil would also prevent overrun, would it not,—and that is a term likewise used in the heating field?
A. Well, that isn't what it was put there for.
Q. It was put there to take care of the lag?
A. Yes, that is right.

Q. And lag is that thing which refers to the time that it takes the heat from where it is created to get to the place where it is to be used?

A. That is right.

Q. So that in the situation that you are talking about, there was a delay?

A. That is right.

Q. In the heat getting from the place of combustion to the place where it was to be used?

A. That is right.

Q. And in order to overcome that objection you used the heater coil in one of the thermostats?

A. That is right.

Q. And again you do not know whether that happened the first year of service or the second year or the third year?

728 A. I don't remember that.

Q. But you do recall that heater coil, in order to take care of the lag, going in before you left Mr. Portner's employ?

A. That is right.

Q. In 1936; am I right in the year?

A. It is six years ago.

Q. Well, give me the year when you left, now.

A. Well, that I don't just remember. It is around six years from now.

Q. That is, it was some time in 1936?

A. That is right.

Q. Early in 1936?

A. No, it was in the summer time.

Q. 1936?

A. Yes.

Q. So that what you have been testifying today with respect to the Portner installation has not been of any concern of yours since you left Mr. Portner's employ?

A. That is right.

Q. And whatever you have seen with respect to the installation was merely when you called upon him in order to pick up a service part or control?

A. That is right, and by going in there, the way it operated in the building there, I would say it was the

729 same. I didn't see any changes.

Q. You didn't pay any particular attention to determine the sequence of the operation when you were in there picking up controls?

A. No, except it was very comfortable and I noticed the unit heaters would kick on and off the way they did when I was there.

Q. That is so far as the result is concerned?

A. That is right.

Q. In other words, it gave heat so that the place was fairly warm?

A. That is right.

Q. And comfortable?

A. That is right.

Q. Do you recall any time when you removed any one of the controls from the Portner installation and used them elsewhere?

A. No, I don't remember of ever taking them off and doing that. We may have, but I wouldn't remember now.

Q. I am asking about what you yourself did?

A. I wouldn't know now.

Q. You don't remember?

A. I don't remember.

Q. If you took a control off and used it in a customer's place or residence, would that same control come back on the job, or would you put a new control in in place of 730 the one that you had given to the customer?

A. That I wouldn't remember. We usually change the control. We just put that on temporarily, and then give the customer a new control.

Q. And the old control would come back on the job?

A. That is right.

Q. And would be rewired and reinstalled?

A. That is right.

Q. You had nothing to do with the ordering of any controls when one was used?

A. No.

Q. That was taken care of by Mr. Portner?

A. That is right.

Q. I am correct in my understanding that you have paid no particular attention to this installation during the last six years?

A. That is right.

Q. And prior to your testifying here today you did not go out and look the job over?

A. No, I didn't.

Q. And all of your testimony with respect to the use of Time-O-Stat controls is just mere memory on your part?

A. That is right.

Q. And as to the particular time when the controls
731 were put in, including the Time-O-Stat controls, you are now telling us that that was prior to the formal opening—

A. That is right.

Q. —of the Portner place of business?

A. That is right.

Q. And you are sure of that?

A. Absolutely.

Q. There is no question in your mind at all?

A. No, sir. Absolutely not.

Q. Do you recall when you first saw the name Time-O-Stat Controls Company on any piece of control equipment?

A. What was that question?

(The question was read by the reporter as above recorded.)

A. No, I don't remember.

Q. Have you ever used in your service work controls made by the Time-O-Stat Controls Company?

A. I wouldn't remember. I probably have.

Q. You probably have?

A. I probably have.

Q. What other controls by other control manufacturers did Mr. Portner have in his place of business at about the time that he opened the present establishment at 225 West Front Street?

732 A. I don't remember any, except Mercoid controls, and then this Time-O-Stat control that we used for the clamp-on control there.

Q. Did he have any Time-O-Stat thermostats?

A. No, he didn't.

Q. Or any Time-O-Stat stack switches?

A. No, not that I remember.

Q. Any Time-O-Stat limit controls?

A. No.

Q. He merely had the Time-O-Stat control that is here?

A. That is right.

Q. In the installation?

A. That is right.

Q. And you don't recall whether he had three of them or six of them or a dozen of them on hand?

A. No, I wouldn't know that now.

Mr. Freeman: That is all.

Mr. Moore: No redirect. Thank you very much, Mr. Hill.

733 JAMES W. OWENS called as a witness on behalf of the complainant, being first duly sworn, testified as follows:

Direct Examination by Mr. Moore.

Q. Wil you please state your name?
A. James W. Owens.
Q. Your age?
A. Age fifty.
Q. Residence?
A. 4448 North Mozart Street, Chicago.
Q. What is your occupation?
A. Executive vice president, Mercoid Corporation.
Q. Who is in charge of sales in The Mercoid Corporation?
A. I am.
Q. How long have you been in charge of sales?
A. Since I started with the company back in 1920.
Q. And what office did you hold then?
A. Vice president in charge of sales.
Q. When did the Federal Gauge Company first start the manufacture and sale of controls for oil burners and heating systems?
A. About 1921.
Q. And you were vice president at that time.
A. That is right.
734 Q. About how many competitors did you have in that particular line?
A. Well, we had Minneapolis Heat Regulator Company, the Honeywell Heating Specialties Company and the Absolute Con-Tac-Tor Company.
Q. Was there any change made in your company and in the competitors about 1928?
A. Well, about 1928 the operating company became The Mercoid Corporation instead of the Federal Gauge Company, and about that time Minneapolis Heat Regulator Company and the Honeywell Heating Specialties Company merged as the Minneapolis-Honeywell Regulator Company.
Q. And had any other competitors entered the field at about that time?
A. In the meantime, Penn Electric Switch Company had entered the field and Time-O-Stat had taken over the Absolute Con-Tac-Tor Company.

Q. How about 1940, how many competitors did Mercoid have in this general field?

A. We had the Minneapolis-Honeywell, Penn Electric Switch Company, Perfex Corporation, White-Rodgers and a few other smaller companies whose names I do not recall right now.

Q. What became of this Time-O-Stat Controls Com-
735 pany that you spoke of?

A. They were taken over by Minneapolis-Honeywell along about 1930 or 1931.

Q. You are acquainted with the Perfex Corporation?

A. Very well.

Q. How long have they been in this business?

A. About 1935.

Mr. Freeman: When did he say that Minneapolis-Honeywell took over Time-O-Stat Controls?

The Witness: About 1930 or 1931.

Mr. Freeman: Not in 1929?

The Witness: I didn't say 1929. I am just saying what I think. About 1930-1931.

Mr. Moore: Q. Are you acquainted with the White-Rodgers Company of St. Louis?

A. To some extent, yes.

Q. How long have they been making controls of this character?

A. They started up about five or six years ago.

Q. Are you acquainted with the Cook Electric Company?

A. Very well.

Q. How long have they been in business; how long have you been acquainted with them?

A. I have known the president of the company for
736 better than twenty years.

Q. When did they enter this field of competition with Mercoid, on controls such as we are talking about today?

A. We never did consider Cook really as competitors, because we had sold them parts for what controls they did make, and we have been selling them those parts for possibly six or seven years.

Q. Are you acquainted with Bendix Aviation—Freiz Division?

A. I am.

Q. How long have they been putting on the market controls for the control of heating systems?

A. Well, they have been making controls of one sort or another, to my knowledge, for better than ten years.

Q. Mr. Courteol has produced circulars, catalogs and bulletins of The Mercoid Corporation before his time when he became president in 1938, and these have been marked for identification. Now, Mr. Owens, who was president of the Federal Gauge when you were vice president?

A. L. H. VanNess.

Q. And who succeeded him?

A. He was succeeded by L. B. Reed in 1933.

Q. And who succeeded Reed?

A. H. Courteol in 1938.

737 And where are Mr. VanNess and Mr. Reed at the present time?

A. They are both deceased.

Q. I would like to show you certain catalogs and instruction sheets and ask you if you can identify them?

Mr. Moore: May it please your Honor, you have all of the originals in your desk, so I will show him the photostats.

Q. The first is Bulletin D, Federal-Mercoid controls, data sheet No. 1, dated April 1, 1924. Can you identify that?

A. I can.

Q. What is it?

A. It is a circular we put out at that time.

Q. Do you know where it came from?

A. Yes, from the company files, from us.

Mr. Freeman: We will concede that.

The Court: Let me see it, please.

Mr. Moore: Certainly. (Handing document to the court.)

The Court: Go ahead.

Mr. Moore: Q. I show you also Mercoid Bulletin E, dated January, 1924.

Mr. Bair: I believe if you would use the exhibit numbers also it would save trouble.

738 Mr. Moore: All right. The first one, Bulletin D, is marked for identification MERCOID EXHIBIT E.

The Court: Have these all been identified?

Mr. Moore: I want him to identify all of them.

The Court: I say, have they all been identified?

Mr. Moore: No, sir. Yes, they have been marked for identification.

The Court: Counsel, do you have any objection?

Mr. Freeman: Will Mr. Owens state that these Mercoid catalogs were all put out in the regular course of business?

The Witness: Yes.

Mr. Freeman: You know about that?

The Witness: Yes.

Mr. Freeman: We will concede that.

Mr. Moore: MERCOID EXHIBITS U, V, W, X, Y, Z, AA, BB, CC, DD, EE are introduced in evidence as Mercoid exhibits bearing those numbers.

(The exhibits were so marked.)

Mr. Moore: Q. Mr. Owens what was the custom of dating these various bulletins?

A. Some are dated in the front. Where we did not date them in the front you can always find a date and the quantity printed at the lower right hand corner, such as 739 on here. This was two thousand in August, 1931.

Q. What is that? Can you read that?

A. RMC.

Q. No, the numbers on there.

A. I said 2/8/31.

Q. And that was your custom where it is not dated on the front?

A. That is right.

Q. You date them somewhere else?

A. That is right.

Q. And that is the date when they were printed and put out?

A. Yes.

The Court: Let me see that one.

Mr. Moore: You have the originals on your desk, your Honor.

The Court: I just want to see that one.

Mr. Moore: They show clearer.

The Court: What does that read, Mr. Witness?

The Witness: I would understand this to read—the first figure I believe is "2," is it not? Two thousand printed in August, 1931.

Mr. Moore: Q. I show you here an automatic controls catalog of Time-O-Stat Controls Company for oil burners, 1929, and ask you if you recognize that?

740 A. I do.

Q. Where did that come from?

A. It came from the company files under my supervision.

Q. How does it happen that a catalog of a competitor was found in your company files?

A. Well, I always had the salesmen pick up literature, competitive literature, at the time it came out. When Mr. Schultz came with the company I turned all that over to him. You notice his initials in front there, indicating it came from his file.

Q. About how soon after a competitor would publish a bulletin would it come into your possession?

A. Well, almost immediately.

Mr. Moore: The cover, first inside page and pages 026 and 027 of this catalog are offered in evidence as MERCOID EXHIBIT RRR.

The Court: Any objection?

Mr. Freeman: No.

The Court: It may be received.

(The exhibit was so marked.)

Mr. Moore: Q. I show you here photostats of certain correspondence with the Peninsula Oil Burner, marked for identification Mercoid Exhibit CCC and I show you the originals of these letters. Is there anything on that
741 first page that would identify that letter to you as your having anything to do with it?

A. Yes. I have written the figure 50, cutting in point question mark, cutting out point question mark, on the front in my handwriting.

Q. What is the second piece of correspondence, the carbon?

A. It is an acknowledgment dated January 19, 1926. According to the initials in the lower left hand corner I dictated it, to the Peninsula Oil Burner Company, in response to their letter of January 14th.

Q. The next one is a letter dated January 23rd. Is there anything on that to indicate that it went over your desk?

A. No. This went to the order department.

Q. And the carbon copy which is attached?

A. It was acknowledged by Mr. Van Ness.

Q. And I believe there is also—

A. That is a copy of the order from the order department.

Q. And there is a shipping date on that?

A. Which has a shipping and an invoice date both. Invoiced February 1st, shipped January—I cannot read this.

Q. That was your custom, was it, of marking or-
742 ders with the invoice stamp and the shipping stamp?

Mr. Freeman: He has the originals there and we will concede them, if Mr. Owens states they came from his files.

Mr. Moore: Very well.

Q. Where do those come from, the originals?

A. From the company files.

Mr. Moore: The correspondence identified as Mercoid Exhibits CCC is hereby offered in evidence as MERCOID EXHIBIT CCC.

(The exhibit was so marked.)

The Court: Are you going to offer that whole pile eventually?

Mr. Moore: Yes.

The Court: Hand it to Mr. Freeman and see if he will admit it.

Mr. Moore: All right.

Mr. Freeman: If Mr. Moore or Mr. Owens can tell us that in these volumes there are contained those letters and that they were received and so forth, I think we will agree with them.

Mr. Moore: Q. We have the volumes of Mercoid correspondence here. I show you these various letters. Can you state that they are photostats taken from the originals which are in those volumes?

743 A. I can.

Mr. Moore: The following correspondence is offered in evidence: Miller Automatic Services, MERCOID EXHIBIT DDD;

Premium Warm Heater Company, MERCOID EXHIBIT EEE;

Socony correspondence, MERCOID EXHIBIT FFF;

XXth Century correspondence, MERCOID EXHIBIT GGG;

Holland Furnace Company correspondence, MERCOID EXHIBIT HHH;

Also the Portner correspondence of November 28, 1928, MERCOID EXHIBIT III, and the wiring diagram attached to that correspondence as MERCOID EXHIBIT JJJ.

Mr. Freeman: In conceding these letters, Mr. Moore, I understand that I will have an opportunity to look at the originals, and I think in one or two cases some of these letters refer to or in answer to a letter from a customer,

and you will remember I said I wanted to see at least the letter that came in. I do not necessarily want it introduced.

Mr. Moore: We will be very glad to. They are right here in court.

The Court: Very well.

Mr. Moore: Mercoid shipping order addressed to Portner, Mercoid Exhibit KKK, and there is one letter that
744 was shown to Mr. Portner, and at that time marked for identification Mercoid Exhibit SSS, I think, which we will have to have photostated and introduce that in evidence.

Mr. Freeman: We will concede that letter.

Mr. Moore: Yes.

There is also the Portner announcement and acknowledgment from Mercoid, Exhibit LLL.

Mr. Freeman: That goes for all of this correspondence taken from the files of the Mercoid Corporation.

The Court: Very well.

(The documents were so marked.)

Mr. Moore: Direct examination closed.

Cross-Examination by Mr. Freeman.

Q. Mr. Owens, you mentioned competitors in connection with the control field, and I am assuming that when you refer to a competitor you are taking in the control field generally, as distinguished from controls of the kind that we might call furnace controls?

A. The control field generally.

Q. And in the control field generally, General Electric is a competitor, is it not?

A. You mean, they make controls?

745 Q. Yes.

A. Well, yes and no. They have made some controls in the past, but I think they have bought most of their controls with the parts that they use for assembling the controls that they made under their own name, but as far as going out and selling them in competition with other control manufacturers, I still have to say that we do not consider General Electric a competitor.

Q. I am not so much interested in what you consider as a competitor. I am interested in whether or not General Electric manufacture controls.

A. That is my understanding of it, a. I outlined it to you.

Q. Had you ever heard of the Penn Heat Control Company of Philadelphia, Pennsylvania?

A. Yes. I was acquainted with that company very well.

Q. That was a company you did not mention and it was a manufacturer of controls, was it not?

A. For a short time. They were owned by the General Electric Company.

Q. But it was a separate company?

A. It was a separate company, a subsidiary of General Electric.

Q. That manufactured controls?

746 A. Yes.

Q. Did you know how long that company was in business, in the control field?

A. Well, it started out with quite a flourish. I would say about 1926 or 1927, and before 1930 they were about washed up.

Q. Do you know whether or not General Electric took over Penn Heat Control Company of Philadelphia, Pennsylvania, and thereafter continued in the manufacture and sale of controls under the name of GE?

A. Well, I don't believe that is the way it worked out, Mr. Freeman. At least, that was not my understanding of the way it worked out.

Q. You do know that General Electric make and sell timer devices for use in connection with heating plants, stoker controls, to be exact?

A. We buy a General Electric day and night clock that we sell in conjunction with our own thermostat.

Q. So that GE does make controls?

A. Yes, of that type.

Q. In this general field?

A. No, not in the general field.

Q. Well, just what do you mean by the general field, so we are both talking about the same thing?

747 A. What do you mean by the general field? If you be more specific I will try to be more specific.

Q. Do GE make thermostats?

A. They did at one time. I do not know that they do today.

Q. They made thermostats in the year 1931, did they not?

A. I could not say that they did.

Q. Do you know whether they made thermostats in 1932?
A. I cannot say that they did.
Q. You do know that they made thermostats after they took over their wholly-owned subsidiary, Penn Heat Control Company, don't you?
A. No, I do not.
Q. Have you ever seen any of GE's catalogs?
A. Not recently.
Q. Do you recall seeing any of eight, ten, twelve years ago, with respect to the controls made by GE?
A. No. I would say it was about fifteen years ago that I saw one of their catalogs about that.
Q. That would take it back to around 1926, wouldn't it, fifteen years ago?
A. 1926 or 1927.
Q. GE was not mentioned at all when you were testifying in answer to Mr. Moore's question, was it?
748 A. Sir?
Q. I say, GE was not mentioned at all when you were answering Mr. Moore as to competitors?
A. When I talk about competitors, Mr. Freeman, I talk about our competitors. At that time GE were competitors of Minneapolis-Honeywell, due to the fact that they hired a large number of men in every city in the United States and went out on a campaign to sell damper regulator sets from door to door in competition with Minneapolis-Honeywell, which did not affect us in the least, as we did not make damper regulators.
Q. The damper regulator is an item or an instrumentality, however, in the general classification of controls, am I right?
A. As far as Minneapolis Honeywell are concerned, yes. As far as we are concerned, we are not competitors.
Q. Then you term competitors to mean or to include the particular sales policy of the company?
A. No, sir. I term competitors the same way as you might term another patent lawyer who was looking for patent business as a competitor of yours. A criminal lawyer is not a competitor of yours, despite the fact that he is a lawyer.
Q. Well, I limited my question, Mr. Owens, and I do
749 not want to get into a discussion with you.
A. I am trying to explain my idea of competitors.
Q. I limited my question with respect to controls.
A. Yes.

Q. And I asked you in advance whether you were talking about controls generally and you said yes. Now you are telling me that GE did make room thermostats, or at least the Penn Heat Control Company, its wholly-owned subsidiary, made thermostats, is that correct?

A. They made them in connection with the damper regulator and later on in that connection they sold them for oil burner use, yes.

Q. So that GE made and sold oil burner controls likewise?

A. Penn Heat Control, yes.

Q. That is the Penn Heat Control?

A. Yes.

Q. Sold oil burner controls, which we might call a stack switch, or a stack safety, is that correct?

A. That is correct.

Q. And Mercoid makes and sells, doesn't it, stack switches and oil burner controls and room thermostats?

A. Yes.

750 Q. So at least with regard to what GE did with respect to its manufacture and sale of controls, it was a competitor of Mercoid?

A. In that respect, yes.

Q. Now, what about Russell Electric Company, was it ever engaged, as far as you know, in the manufacture and sale of controls?

A. Yes.

Q. But I take it it was a small company and you did not consider it a competitor?

A. I did say in listing certain companies as competitors "and others."

Q. Now, will you give me those "and others"?

A. Well, there was the Industrial Engineering Company of Evansville. They made stoker controls, stoker timers. There was another company up in Wisconsin making stoker timers, I can't remember their name right offhand, but I think it was Paragon.

Q. I am interested in the older companies that you talked about, around in 1926 or 1928.

A. There might be others. I am trying to recall the others, Mr. Freeman.

Q. Go right ahead. I am sorry. At the present time, do you consider the Johnson Company of Milwaukee a 751 competitor of yours in connection with the sale of controls?

A. Johnson Service Company?

Q. No, the other Johnson company, Automatic Controls Devices, of which Roy Johnson is president. You know Roy Johnson.

A. Do you mean Automatic Products Company?

Q. Yes.

A. No.

Q. Do they make controls?

A. They make thermostats.

Q. But you do not consider them competition?

A. No.

Q. They make oil burner controls, do they not?

A. They make oil level valves, for what you call vaporizing burners.

Q. And they make room thermostats?

A. They make room thermostats to operate in conjunction with the oil level valve.

Q. So they do sell those thermostats on the open market?

A. They might.

Q. You know, as a matter of fact, they do?

A. No, I said they might. As far as we are concerned, they have not interfered with our business in any way.

Q. What do you mean by "interfered with our business"?

752 A. If anybody takes an order from me, he is interfering with my business.

Q. In other words, that is just what you call competition?

A. Competition, yes; that is competition.

Q. What about Spencer Thermostat Company?

The Witness: Repeat that question.

(The question was read by the reporter as above recorded.)

The Witness: A. Spencer?

Mr. Freeman: Q. Do they make controls?

A. Well, we began to hear about Spencer, I think, about five or six years ago.

Q. Do you still hear about them making controls?

A. Oh, I am trying to recall. They do make a furnace control, I believe, today.

Q. So if they took an order away from you, why, then, they are a competitor, and if they did not take an order away from you, they are not a competitor?

A. Well, I happen to be very friendly with the chap in charge of that particular department. He was my New

York manager when he was at The Mercoid Corporation.

Q. But he is a competitor?

A. Well, he comes up and sees us right along. He
753 is a very friendly competitor. We do not look upon him as a competitor, really.

Q. Mr. Owens, I am not trying to find out or pry into your affairs as to determining who is a friendly competitor and who is a competitor of another kind. I am just trying to find out the names of those competitors of yours who for some reason were not specified when Mr. Moore asked you on direct examination, and I am helping you along by calling your attention to companies that I happen to know are competitors of yours.

A. We do not actually compete with everybody in the field making controls, because, after all, we cater to certain fields. We leave other fields to certain competition, such as you mention. We do not try to hog the whole business and take all the business in the world away from everybody else. We are satisfied to go along, sell our own controls, and not step on the other fellow's toes. I could go ahead and say that Cutler-Hammer and Allen-Bradley—

Q. And Square D?

A. (Continuing)—and Square D and all those people, are competitors, because, after all, they are in the control game, but we do not happen to go after that particular type of business. We respect their field and we like
754 to have them do the same to us.

Q. So there are quite a number of manufacturers, generally speaking, now engaged in the general making of controls?

A. Yes, sir. You probably could name 25 to 35 different companies that are engaged one way or another in the manufacture of controls or some type of control.

Q. Some of them are a little stronger competitivewise than others with your particular company?

A. Well, some work in the same field that we do. Maybe we will have two or three different competitors that are working in two or three different fields.

Q. And I take it that there some ten or fifteen companies back in 1926 and 1927 that were in this general control field?

A. It was much more restricted at that time. A company like Penn Heat coming into the field looked like a big company.

Q. How about General Controls out on the West Coast, do they make room thermostats?

A. Yes, sir.

Q. And they make controls generally, do they not?

A. Yes, sir.

Q. And that is a pretty good-sized company, is it not?

755 A. Yes, sir.

Q. And they are pretty good competitors of yours out on the West Coast, are they not?

A. Well, they sell a lot of our equipment on the West Coast and we sell a lot of their equipment on the East.

Q. But The General Controls is a manufacturer of controls?

A. Whom we work with very closely on some of their items, and they do the same thing on some of our items.

Q. And some items that they make are in competition with some items that you make?

A. Yes, sir.

Q. Room thermostats, by way of example?

A. Yes, sir.

Q. And when they sell a room thermostat to a particular customer, that means you cannot sell that customer a room thermostat?

A. No, but if they find out our thermostat will do a better job than theirs, they sell our thermostat.

Q. I was talking about when they sold a thermostat, what that thermostat would do was in competition of thermostats of like kind made by your company.

A. It would be, if we were making a gas valve to go with that thermostat, but when we sell a gas valve, we
756 sell one of their gas valves, and we try to sell one of our own thermostats, and we generally succeed.

Q. So that if they sell a gas valve with one of their thermostats, that, at least, keeps you from selling one of your thermostats to that company?

A. Well, we sell it anyway, because we have no gas valve to sell with it. That is their field.

Q. But you do try to sell your thermostats to go along with their gas valve in competition with their thermostat?

A. Yes, sir.

Q. And it is a pretty good-sized company, is it not?

A. It is.

Q. Did you mention Detroit Lubricator Corporation, a

division of American Radiator, as competition in 1940 when you were naming these companies?

A. No, I do not believe that I did.

Q. Detroit Lubricator is a pretty good competitor of yours, is it not, even though you do do some business with it?

A. Well, we have done as high as half a million dollars a year business with Detroit Lubricator Company.

Q. On particular items that they do not manufacture?

A. Certain items they do manufacture.

757 Q. And you are in competition, are you not, with Detroit Lubricator Company in both the manufacture and sale of controls?

A. A friendly competition, in view of the fact that we have an arrangement whereby certain Mercoid controls are assembled in the Detroit plant, and they are allowed to sell them in competition with us, although we hold the various patents covering those devices, and we set the selling arrangements.

Q. But they call on the trade, generally, in order to sell controls in competition with Mercoid?

A. Yes, I would say they do.

Q. As to whether they are friendly or not does not make any difference so far as the fact that when they get an order it is an order that goes to Detroit Lubricator; it does not go to Mercoid?

A. Yes, half the time it does.

Q. That depends on certain controls?

A. That is right.

Q. Certain things that you make for them?

A. They go out and sell Mercoid controls, the same as they do Detroit Lubricator controls. You asked me to name competitors, and we do not consider them a competitor along the lines you are talking about.

758 Q. I thought a competitor generally meant someone that was out selling, making about the same things and selling about the same things and calling on about the same class of customers?

A. I think that is a good definition.

Q. And Detroit Lubricator would come within that classification?

A. I agree with you, surely.

Q. You referred to the correspondence with Peninsula Burner & Oil Company, Mercoid Exhibit CCC, and particularly to the letter written by Mr. L. H. Van Ness. I now ask you what is meant by that portion of the letter

with respect to, "if you do not want the second instrument, please return it to us for credit."

Will you tell us, first, what that second instrument is?

A. A limit switch.

759 Q. And do you know whether or not the second instrument was actually retained by the customer?

A. As far as I know, from a search of the files, it was never returned.

Q. If you followed Mr. Van Ness' statement, or if the customer had returned the second instrument, which you have now described as the limit switch, could you still use the fan switch to carry out the type of operation referred to by Mr. Van Ness in his letter to the Peninsula Oil Company with the limit switch entirely removed from an installation?

The Witness: Would you repeat the question, please?

(The question was read by the reporter as above recorded.)

The Witness: A. Now, you are assuming, of course, that if he returned this switch or did not use the Mercoid limit switch that there would be no limit switch whatsoever on that installation.

Mr. Freeman: Q. That is exactly it, and I am now asking you whether you could then use the fan switch to carry out the sequence of operation specified by Mr. Van Ness in his letter, that is, where the fan switch would start operating at a temperature of 200 degrees and would remain in "on" position until the temperature of the furnace
760 dropped to 140 degrees.

A. Only if there was a thermostat employed in connection with the system.

Q. So that the fan switch would then start operating at 200 and continue to operate until the furnace cooled to 140 degrees?

A. Until the burner shut off and the temperature in the dome dropped back to 140 degrees.

Q. So that with a limit switch omitted you could still get the type of operation requested by the Peninsula Oil Burner Company in its letter of January 23, 1926, to your company? Is that correct?

A. Yes.

Q. So that the letter of January 23, 1926, refers only to a fan switch without any reference whatsoever to a limit control, is that correct?

A. I will have to read the letter. Will you repeat the question?

(The question was read by the reporter as above recorded.)

A. It is correct.

Q. And the use of a limit switch was first injected into this set of correspondence, Mercoid Exhibit CCC, by Mr. Van Ness in his letter of January 29, 1926, is that cor-
761 rect?

A. On the face of it, yes.

Q. Well, you know that these are all of the documents that have here been produced?

A. There might be a report from Mr. Matthews where he stated that he recommended a limit switch to the customer, or he might have outlined the reason that a limit switch on this particular job would not be necessary.

Q. Well, I will give you an opportunity then to see if you can figure up anything further, and to supplement your answer, but as it stands now, with the evidence that has been produced by Mercoid, the first mention about any use of a limit switch was in the letter written by Mr. Van Ness?

A. That was usual. We had recommended a limit switch with the fan control long before this date.

Q. So that you could get the full operation of a fan switch, as requested by the Peninsula Oil Burner Company, in their letter of January 23, 1926, even though no limit switch was employed at all, that is correct, is it not?

A. Well, I could not answer you that.

Q. Is it not a fact, Mr. Owens, that you could get the operation specified by the Peninsula Burner and Oil Company in its letter of January 23, 1926, even though no
762 limit switch was in the installation?

A. Well, those are all questions the sales department took up with the engineering department and got their response to, so anything I would answer you would just be guessing at it, and I do not believe I am supposed to be on here as an expert, Mr. Freeman.

Q. No.

A. I can give you my opinion, but I would not want to give it to you as an expert opinion.

Q. Mercoid Company did tell the Peninsula Oil Burner Company that if it did not want the limit switch it could return it, is that correct?

A. That is correct.

Q. Did you write letters of that kind, substantially, fol-

lowing the letter written by Mr. Van Ness to the Peninsula Oil Burner Company, to other customers?

A. Yes, that was customary.

Q. And you wrote the letter to Socony Burner Corporation of December 20, 1927, Mercoid Exhibit FF, did you not?

A. Yes, sir.

Q. So that it was not at all out of the general run of things for you in your capacity as vice president of The Mercoid Corporation to answer correspondence with
763 respect to inquiries about the controls?

A. That is correct.

Q. And to make recommendations as to the use of controls?

A. That is correct.

Q. And I take it since we do not have Mr. Van Ness here, that letters of this general kind were sent out both by yourself and by Mr. Van Ness in answer to inquiries about controls?

A. Following consultation with the engineering department, yes.

Q. And when you say "following consultation with the engineering department," will you name those in the engineering department around about 1926, 1927, 1928, and 1929 with whom you had the conferences or with whom you consulted prior to answering this type of letter?

A. Well, I don't recall now, but we had somebody around there who was classed as an engineer who could give us that information.

Q. Well, might you talk to Mr. Ira E. McCabe?

A. We might have.

Q. Might you have talked to Mr. Frank Black?

A. We might have.

Q. And might you have talked to Mr. Schultz?

764 A. No.

Q. Who else of those that would come in that general classification of engineers that you would confer with?

A. Well, we had fellows with us like B. F. Werb, H. W. Petty.

Q. Coming back to the markings on certain of your catalogs or bulletins,—and I am calling your attention particularly to Mercoid Exhibit AA,—we have upon the back page the following notation: 10-M-6-30, and I take it that means ten thousand printed during the month of June of the year 1930, am I correct?

A. Yes, that would be correct.

Q. And I now call your attention to Mercoid's Exhibit Z, which is likewise a bulletin put out by The Mercoid Corporation, and on the back page I find the numbers—10-8-29, and I take it that means ten thousand in the month of August in the year 1929.

A. That would be correct.

Q. And that has been a practice followed by your company how far back?

A. Well, I guess ever since we could afford printing.

Q. So that the first number meant quantity in thousands, the second number meant the month, and the third number meant the year?

765 A. That is right.

Q. And the initials which may have followed, the printing company?

A. Probably that is what it is. I tried to figure that initial out. I didn't know what that was myself.

Q. I am now handing you Mercoid Exhibit Y, and on the back page where we have some diagrams, page 32, to be exact, there appears the letters or numbers, rather, which appear to be 5-7-29, and I take it that means five thousand printed in July of 1929.

A. That is right.

Q. And that was the practice followed by Mercoid Corporation at least as early as 1929?

A. Oh, yes.

Q. And it was the practice followed by Mercoid Corporation, say, as late as 1933 or 1934?

A. Yes.

Mr. Freeman: That is all.

Redirect Examination by Mr. Moore.

Q. You have testified on cross-examination as to the mention of markings on these various publications. Now, how long have you personally handled the advertising matter of this corporation so that you would know definitely what the markings on every one of those meant?

766 A. Well, I handled it up to 1930, when Mr. Schultz came to Chicago and we turned it over to him at that time.

Q. I call your attention to the markings on Exhibit Y, and what do you find the printer's marks to be?

A. Ten thousand printed August, 1929.

Q. All right. Now, I call your attention to Mercoid Exhibit AA, and what do you find on there?

A. Ten thousand June, 1930.

Q. Where do you get the ten thousand from?

A. From the 10 M.

Q. Did you find a 10 M on the other one?

A. No, that is 10-8-29.

Q. What did that mean to you, then, ten thousand, or what?

A. No; they apparently put the exact date down rather than the quantity.

Q. All right. Now, I call your attention to Mercoid Exhibit CC, and what do you find at the bottom there?

A. 32-M-8-37.

Q. What would that mean?

A. Thirty-two thousand, August, 1937.

Q. I call your attention to Mercoid Bulletin A-14, Exhibit BB, and on next to the front page there is also
767 some markings. What does that mean?

A. That is 2-8-31 also.

Q. What does it mean?

A. Well, apparently it means February 8, 1931.

Q. Do you know definitely whether that does or not? Who put out that bulletin, do you remember?

A. This particular bulletin, I believe, was put out by Mr. Schanz, our advertising manager.

Q. Was there anyone in the engineering department who had anything to do with it?

A. Mr. Schultz.

Mr. Moore: Redirect examination closed.

Recross-Examination by Mr. Freeman.

Q. Mr. Owens, is it not a fact, and is it not still the practice of your company, even as late as September of 1934, to use the month only and the year only as distinguished from using the month and the day when a catalog is published?

A. That is right.

Q. So that in this bulletin under discussion, which has the notation 2-8-31, it really means not the date of February 8, 1931, but two thousand printed in the month of August and in the year of 1931?

768 A. Well, that is what I thought when I first looked at it, Mr. Freeman, and at the time I wondered why

we only had two thousand printed, until Mr. Moore showed it to me again and I saw that apparently they had put the date down, the date of the issue of the printing rather than the quantity.

Q. You think then that particular bulletin is one where the date, or the specific date, is shown as distinguished from the quantity, the month and the year, as we find on the rest of the bulletins put out by Mercoid Corporation, is that correct?

A. The 2 there, which would normally indicate the quantity, forces me to that conclusion, Mr. Freeman.

Q. That it is the date?

A. That the date was shown rather than the quantity, because two thousand would be a pretty small quantity of bulletins of that type and at that time.

Q. You have published bulletins in quantities of two thousand, have you not?

A. We have probably published less than that, too.

Q. So that if that happened to be 1-8-39, by similar deduction, you would have said January 8, 1939?

A. No. At the start I had in mind the figure 1 as you have mentioned indicates normally the quantity, and
769 that is what happened, but sometimes when you change printers and you do not call their attention to that, they will go ahead and change it the way you see it there. So that I know that two thousand quantity could not possibly be right, and it could only be the month indicated.

Q. Mercoid Company could get us the printer's invoice and the work sheet or the data furnished to the printer that perhaps would determine accurately what is the fact, could it not?

A. Some of these printers do not stay in business that long. We might try it, though.

Q. Well, you are willing to tell us now that that 2, the first number, could be quantity in thousands?

A. It could be what?

Q. It could be quantity in thousands.

A. Well, with the M off, it is very, very possible. It is highly improbable that we would print only two thousand.

Q. But I am saying that the two could mean quantity in thousands as distinguished from the second month of the year?

A. Well, that is the way I read it to start with, so I could not deny that very well.

770 Q. You said something about changing printers, and

I now call your attention to Bulletin No. AAA, which has the initials R.M.C. following the numerals, and the bulletin under discussion, Mercoid Exhibit BB, after the numerals likewise has the same initials, R.M.C., is that correct?

A. Yes.

Q. So that prior to the publication of the bulletin Exhibit BB in the year 1931, your company had used the same publishers to publish bulletins of the Mercoid Corporation?

A. What is the other one?

Q. 1931.

A. Yes, that is correct.

Q. So that your suggestion here that in changing printers they may have made some change was merely speculation on your part?

A. We often change printers.

Q. But your explanation that in changing printers it may have meant the month as distinguished from quantity.

A. Are those the same two?

Q. The same printers, the same initials, and I assume that they are the same printer.

A. These are not the same two, Mr. Freeman.

771 Q. Are they the same printers?

A. They are the same printers, but they are not the ones you are talking about. May I see the other one that you are arguing about here, about the quantity or the date? I have not got either one of those. I think that other one is marked P.S.C., which probably means Printers Service.

Q. I would not answer without looking, because the other one is marked R.M.C.

A. R.M.C., that is the same one.

Q. So now with that explanation you are stating here—

A. That is the same.

Q. —it to be the fact that in 1931, when the one in question was printed, you had prior to that time used the same printer?

A. That is right.

Mr. Freeman: That is all.

Mr. Moore: No further examination.

(Witness excused.)

772 Mr. Moore: May it please, your Honor, this witness made a statement which took me entirely by surprise, and contrary to all the information I have had as to the date of these various bulletins. He has stated this particular one which we are relying on, Mercoid A-14 was prepared by Mr. Schultz of the engineering department. Now, Mr. Schultz is on his way down. I am afraid I will have to put him on the stand to give us the information as to when that particular bulletin was printed.

Mr. Freeman: As long as he is on his way down, I would like to see something of a more concrete nature than merely speculation and conjecture.

Mr. Moore: He has left the plant. I have over in my office three or four or five reprints of this bulletin dated in the same manner, without the "M" and I will produce those.

In the meantime, I have some depositions that were taken in Bloomington. If you care to have me introduce them, I will be glad to.

The Court: Very well.

Mr. Moore: I have here the depositions taken in behalf of The Mercoid Corporation on October 9th and 10th in Bloomington, Illinois. These depositions are the testimony of a photographer, Mr. Sullivan, and five employees
773 of the Williams Oil-O-Matic Heating Corporation, Mr. R. V. Hopkins, the comptroller and secretary, two draftsmen, Mr. Price, the national service manager, and Mr. Lartz, the Bloomington service man.

There is testimony taken in the Evangelical Church in regard to an installation made at that place, and there are photographs taken of that. There is also testimony as to the heating system in the home of Ned Dolan, of Bloomington, and the testimony was taken in the furnace room, part of it, where demonstrations were made.

I also wish to introduce in evidence the exhibits referred to and so identified in the depositions.

I wish to introduce the Mercoid depositions as MERCOID EXHIBIT A, and the exhibits attached and forming a part of it, in evidence, as Mercoid exhibits corresponding to the letters as identifying them with the depositions.

There are about three hundred thirty pages, your Honor, or over, of depositions; it took about two days, and I don't want to take the court's time to read excerpts from those depositions, but I have made a list here calling attention

to the page and the questions and answers relating to the
installation in the Evangelical Church, and the demon-
774 stration, and to the installation in the Dolan residence
and the demonstration, and also as to two wiring diagrams of Oil-O-Mattic, which were introduced in evidence. I will be glad to submit this to your Honor, instead of reading the excerpts from the depositions, if you would care to have me do so.

The Court: Very well. Any objection to this?

Mr. Freeman: I really don't know, your Honor. I haven't had opportunity to check.

Mr. Moore: I am merely calling that to the attention of the court, that particular evidence, instead of reading it into the record.

Mr. Freeman: I am in favor of doing that in order to save time. I am just wondering if you called the attention of the court to one of these witnesses who testified as to the installation, and after he testified as to the drawing which he said corresponded to the installation, you and I went out and took a look at the place and found one of the controls was never on the job. It was a General Electric control. Did you call that to the attention of the court?

Mr. Moore: I think you did that in your cross examination, did you not?

Mr. Freeman: I am asking with respect to these
775 notes that you are asking the court to take, whether
you called that to the attention of the court.

Mr. Moore: I don't remember that fact, Mr. Freeman. If it is in the depositions, they speak for themselves. You can call the court's attention to that when you file your list.

Mr. Freeman: For the time being we will let this list stand. It looks like we will have to check this against the depositions and perhaps make some summary or notation. We have found a very striking thing. After a man has said he checked the installation and testified for a day and a half all about it, we went out and looked at the installation and it was different. It is so easy to testify from memory.

The Court: Very well. The depositions and exhibits therein referred to may be received, and this paper which counsel for The Mercoid Corporation has prepared may likewise be received.

(The depositions were so marked.)

The Court: Counsel for Minneapolis may within—how much time? Twenty-four hours?

Mr. Freeman: I have a problem getting our proofs gathered together with respect to this Portner installation.

776 The Court: How long are you going to be in the case?

Mr. Freeman: We will not be through by Monday.

The Court: Counsel for the Minneapolis Company may by Monday, the 9th day of February, file a like paper with respect to the matters in the depositions to which he wishes to call the court's attention.

Mr. Freeman: I am wondering, and I like this way of doing it, to save the court's time, if we might not make a summary? We could have made a summary and could have given it to Mr. Moore in advance and agreed with him. I would like to make it in the form of a summary.

The Court: Very well. It may be done.

Mr. Moore: As soon as I put Mr. Schultz on the stand, I will be through with my case, your Honor.

The Court: Is Mr. Schultz here?

Mr. Moore: He has not arrived here yet. He was at The Mercoid Corporation when he was called. I did not expect to have him testify.

The Court: When do you expect him?

Mr. Moore: The Mercoid Corporation is at 4200 Belmont, your Honor.

Mr. Freeman: Your Honor, I am going to ask this man on cross examination, since this matter is of vital importance. I understood this exhibit was put in to show

777 something as of February, 1931. Mr. Black definitely testified to it, to show that Mercoid had something right close to this filing date. I am going to ask for something more than just his mere statement. I am wondering—it is ten minutes after twelve—if the court could not use the twenty minutes?

The Court: Recess to two o'clock?

Mr. Freeman: And that would give him an opportunity, and incidentally, give Mr. Moore an opportunity to talk to him a little bit.

The Court: Very well. We will recess at this time until two o'clock.

Mr. Freeman: Thank you.

778 Mr. Moore: May it please your Honor, I was asked to produce some evidence as to the meaning of this

date, 2-8-31. All I have to say is that I have represented The Mercoid Corporation for twenty years and for the first ten years I had an office in their plant and have been associated with these dates and it was always my understanding that a date written like that would be the month, the day of the month, and the year, and I was taken by surprise when for the first time I heard that the first figure stood for the number, as Mr. Owens gave it to you today.

I told you I had reprints in my office. Those are 779 reprints of that bulletin, which are made out in the same manner but of subsequent dates. We have asked to have the records searched of the Mercoid Corporation. I believe there is an invoice coming down. We tried to get it through the printer, but the printer has not kept his records back of 1933, and if the invoice comes down I will be willing to stand on the date of the invoice.

Mr. Freeman: Can you tell us yet what it means? What does Mr. Schultz say it means? He has been here.

Mr. Moore: He was here and you said you would object to his testimony unless he produced some proof, and we haven't the proof, so I let Mr. Schultz go back. He would tell you just what I told you and just what he told us in court the other day when he referred to the bulletins, that he understood it was February 8, 1931.

Mr. Freeman: That was Mr. Black.

Mr. Moore: Today. And Mr. Schultz testified in another case in court here recently that he produced the bulletin, that it was under his direction, that he wrote the copy, that he made the setup with their advertising man and had it printed and it was the printer's custom to put the date as we have it on this bulletin 2-8-31, the way it went into the press. That is all Mr. Schultz will tell you and that is what he told me and that is what I have 780 always understood. As I say, we have asked the Mercoid to send us down the first invoice they could find in this short time on the printing of this bulletin.

Before the complainant rests its case, your Honor, there was a question as to Mr. Freeman objecting to the introduction of Mercoid Exhibit P, which was the license between McCabe and the Federal Gauge, until he inspected the other documents referred to, the articles and the two amendments.

Mr. Freeman: And there is no objection to what has been already introduced, so the exhibit that you have of

fered, as far as we are concerned, now stands without objection.

Mr. Moore: All right.

Mr. Freeman: Does the complainant rest?

Mr. Moore: The complainant now rests.

Mr. Freeman: With the understanding that if Mr. Schultz comes back you are going to put him on?

Mr. Moore: If the invoice is such that it corroborates our date, I am willing to stand on the date of the invoice.

781 HARRY R. VAN DEVENTER, called as a witness on behalf of the defendant, being first duly sworn, testified as follows:

Direct Examination by Mr. Freeman.

Q. Your name is Harry R. Van Deventer?

A. Yes, sir.

Q. And you are a resident of the city of New York?

A. Yes.

The Court: Your initials again, Mr. Van Deventer?

The Witness: Harry R.

Mr. Freeman: Q. And you are a resident of New York City?

A. That is right.

Q. And an engineer, is that correct?

A. Yes, sir.

Q. And you have testified in numerous patent cases for a period of over twenty-five years?

A. Yes, sir.

Q. And you have testified in patent cases in this
782 court in the last year or so as an expert?

A. That is right.

Q. And you are a patent attorney, are you not?

A. Yes, sir.

Q. Now, will you briefly, for the purpose of the record at least, tell us your general experience in connection with electrical matters as well as problems with respect to manufacturing, that would qualify you in this particular case to testify about the Freeman patent here in suit?

A. I am an electrical engineer and began to practice as such in 1905 and have been continuously in practice ever since. Part of that time I have held responsible executive

positions with manufacturing companies making electrical and mechanical devices.

I have had experience with electrical circuits generally. I have had some experience with control circuits and apparatus, thermostatic controls such as involved in this suit.

In connection with my consulting work I have experimented with many kinds of electrical equipment and various assemblies where sequence of operation was involved.

I have been practicing as a patent attorney for over
783 thirty years. I am a member of various engineering societies, the American Institute of Electrical Engineers, the Society of Automotive Engineers, the Electro-Chemical Society.

I have been granted some forty or fifty patents based on various electrical and mechanical devices, some of which have gone into extended use.

Q. You have made a careful study of the Freeman patent here in suit?

A. I have.

Q. Now, Mr. Van Deventer, Mr. Black has given us a rather good description of the Freeman patent and I would like to have you just run through the Freeman patent briefly, keeping in mind that we have had several days of explanation of the Freeman patent. Keeping that in mind, give us a hurried description of the Freeman patent, referring specifically to the patent itself.

A. I think your Honor knows in a general way, at least, what the Freeman patent relates to. There are only one or two things that I would like to say in addition to what has already been said by Mr. Black. I agree with what he has said in respect to the operation of the equipment and the circuits, as far as he went.

Now, we have in the Freeman patent a fan, that we
784 have been referring to generally as a fan, and I would like to point out that this is a furnace fan, that is to say, this fan is associated with the furnace. It may be either in the inlet or the outlet of the furnace. In the ordinary heating system but one of this type, that is to say a furnace fan, would be used, as distinguished from other systems where a number of fans would be used.

Now, the furnace fan in the Freeman patent forces the air to be heated from the furnace through the ducts and into the rooms where it is to be used. In other words, it acts like a pump in circulating what we often call the heat carrier.

The heat carrier in a heating system may be either air or hot water or steam. The physicists usually term that the heat carrier.

This furnace fan of Freeman operates physically and directly on the heat carrier to force the heated air in this case from the furnace to where it is to be used. As Freeman states in his patent, "this regulates the rate of supply of the heat conducting medium."

Now, depending on circumstances, this furnace fan can have any speed or it could have two or more speeds, depending on the conditions of the furnace. That would be immaterial so far as Freeman is concerned.

785 Now, Freeman discloses a circuit and a certain sequence of operation of the various switches and other instrumentalities controlled thereby.

Q. Do you have any drawing here that may illustrate—let us put it in a simplified form—the sequence of operation of the Freeman patent?

A. Yes, I have such a drawing, and there is a copy of it on the easel before us now.

Mr. Freeman: We will mark the sequence drawing of the Freeman patent as M-H Exhibit 13.

(The drawing was so marked.)

Mr. Freeman: Is there any objection, Mr. Moore, to offering it now, in order to save time?

Mr. Moore: No, indeed.

Mr. Freeman: We will offer the sequence drawing as M-H EXHIBIT 13.

The Court: Let it be received.

(The exhibit was so marked.)

Mr. Freeman: Q. Will you point out on the drawing just what you mean by sequence of operation or simplified sequence?

A. First I would like to talk a little bit about the various circuits which have been discussed here.

We have in this circuit arrangement here a condi-
786 tion that exists in connection with many circuits where there are branch circuits. Therefore I consider that we have here what may be termed a main circuit. We also have a circuit here which we can call the fan circuit and a circuit which can be called the burner circuit or the one controlling the combustion.

The reason I say that we have a main circuit is that these other two circuits are in parallel and from the thermostat, which is the thermostat 18 of the patent, out to the

left this wire is common; and that is likewise true of the other leg of the circuit.

Sometimes we are using this common or main circuit in connection with the fan motor circuit and at other times we are using it in connection with the combustion motor circuit. So that no showing of merely red lines completely out to this switch or blue or black lines completely out to this switch would cover diagrammatically, at least, the true state of affairs, to my mind, because we have in the beginning, beginning with the source of power here, the main switch, a pair of wires or a circuit which is common to both circuits, which at some times operates only in connection with the fan motor and at other times operates only in connection with the combustion motor. So we have in reality three circuits,—a main circuit and two branch
787 circuits in parallel with each other and across the main circuit.

Q. Might you, by way of illustration, refer to the lights in this room and perhaps a fan running into this room electrically operated?

A. If we would consider the fan motor circuit here as a light circuit on your Honor's desk and this combustion motor here as a fan circuit, you will observe that by turning a switch in either of these circuits you can, of course, put out the light without putting out the fan and vice versa, but if I turn out the light then all of the fan circuit extending back to this main switch that your Honor will find in the panel board out in the hall here, if I pull that main switch it disables both of these circuits, because it is in what we call the main circuit or the feeder to this room. When you pull that main switch everything is turned out. By the way, many of these limit switches, your Honor, operate in just this manner. When you pull the main switch you cut off everything. When the limit switch goes off it cuts out everything because it is usually put ahead of the other controls.

Now, having gotten this type of circuit, the first thing we encounter in the main circuit is the room thermo-
788 stat 18 of the patent and then—

The Court: Now, let me see if I understand this.

Q. The room thermostat may break or make all these circuits you refer to?

A. Yes, sir.

Q. And if it breaks one it breaks them all?

A. Yes.

Q. And if it makes one it makes them all?
A. Yes, sir.
Q. Let me be sure of this. The fan switch, of course, may be opened or it may be closed?
A. Depending on the temperature of the furnace.
Q. And the limit switch may be open or it may be closed?
A. That is correct.
Q. Now, the question is, may the fan switch and the limit switch both be open at the same time as a possibility? I mean, could you make it that way?
A. No.
Q. You cannot?
A. No.
Q. Can't they both be closed at the same time?
A. Yes.
Q. Let me get that. Your answer was that they may not both be opened at the same time?
A. They may not both be opened at the same time,
789 but they may both be closed at the same time. I think your Honor will get that quite straight if you—
Q. Just let me go on.
A. Yes.
Q. They may both be opened at the same time?
A. They may both be closed at the same time.
Q. I mean closed.
A. Yes, sir.
Q. Now, then, a question. May the fan switch be open and the limit switch be closed at the same time?
A. Yes.
Q. May the fan switch be closed and the limit switch be open at the same time?
A. Yes, sir.
Q. Then there are four possible conditions, is that it? The room thermostat may open the circuit, so there is no circuit at all. That is one.
A. Yes.
Q. The fan switch and the limit switch may both be closed at the same time. That is two.
A. Yes.
Q. The fan switch may be open and the limit switch may be closed at the same time?
A. Yes, that is right.
Q. That is three.
790 A. That is right.

Q. And the fan switch may be closed and the limit switch opened at the same time?

A. That is right.

Q. That is four. That is what I wanted to get through my mind. That is correct, isn't it?

A. That is correct.

Q. Are there any other possible conditions?

A. There may be going through these temperature relationships in these two circuits, but what you have in mind is correct, and those are the basic four positions which we can have. Of course, whatever the position here, for example, in the limit switch is, whether or not you would get anything depends on the position of the room thermostat.

Q. Yes, I understand that. I started out with the thermostat open. Then nothing could happen other than that?

A. That is right.

Q. When the thermostat is open then you could have three possible—

A. Closed.

Q. I mean closed. Then you could have three possible positions?

A. That is right.

791 Mr. Freeman: Q. Let me run through this sequence and do it as briefly as possible, Mr. Van Deventer, in your answer. If the furnace is stone cold and the room thermostat moves to closed circuit position, then tell us the position of the fan switch and limit switch.

A. The limit switch will be closed, if it is set for a cold condition of the furnace, which it would be. The switch is usually set to close around say, 250 degrees Fahrenheit. So the limit switch 24 in the diagram would be closed, thereby completing the circuit through the thermostat, through the limit switch, through the combustion motor 35 and out on the bottom side of the line in the diagram.

Now the fan switch is open, because the furnace is cold, and that fan switch is not set to come on until some temperature is reached where the air in the furnace is warm, and it has been said here by Mr. Black that a limit for that would be 140 degrees, so I will take his figures.

Q. That is, that the—

A. That is the fan switch 23.

Q. The fan switch starts at 190 or closes at 190 and opens as 140, taking Mr. Black's figures?

A. Yes. So that this fan switch is open; the furnace

792 begins to operate and as the temperature increases when it reaches 190 degrees the fan switch will close. Then both the fan and the combustion motor will continue to operate, until the room thermostat opens its contact, the room having at that time reached the temperature for which this thermostat is set to open.

Q. So the cold position, which we might call position No. 1, when the room thermostat first closes, taking the furnace as being cold, the limit switch is closed and the fan switch is open, is that correct?

A. That is correct.

Q. Then as to the next position, still saying that the room thermostat is closed and the furnace has now risen in temperature to where it is, 190 degrees or above, then what is the position or condition of the limit switch and the condition or position of the fan switch?

A. The limit switch 24 still remains closed, the fan switch 23 closes at 190 degrees Fahrenheit.

Q. So we then have as a second position both the fan and limit switches closed, and the combustion motor and the fan motor both operating?

A. That is correct.

Q. As the furnace increases in temperature and passes to a point where it is beyond the circuit of the limit
793 switch, taking 300 degrees as an example, then what is the condition or position of the limit switch at that time?

A. The limit switch opens when that high temperature is reached.

Q. And what is then the position of the fan switch?

A. It remains closed and the fan continues to operate.

Q. So that as to a so-called third position, the fan switch is closed and the limit switch is open, is that correct?

A. That is correct.

Q. And the combustion has been checked or terminated and the fan continues to deliver heat to the room?

A. That is right.

Q. Now, let us go from that position, since combustion has terminated and temperature drops in the furnace from the so-called hazardous or dangerous point downwards, then what happens to the limit switch?

A. As the temperature decreases it finally reaches, say, 250 degrees Fahrenheit, at which time the limit switch will close the circuit.

Q. And at that time what is the position or condition of the fan switch?

A. The fan is running.

794 Q. So that as the temperature decreases and drops down to 250, the limit switch cuts in and again starts combustion, is that correct?

A. That is correct.

Q. And that cycle of the limit switch opening and closing so long as the room thermostat is closed will continue if you have a hazardous condition, is that correct?

A. It is.

Q. And the fan switch will remain closed all the time during the hazardous condition, is that correct?

A. That is right.

Q. So that the fan switch will remain closed even though the temperature is in excess of, say, 300 degrees, and the limit switch is open, or the limit switch has again closed at a temperature of 250 degrees, is that correct?

A. That is correct.

Q. And that cycle will continue, that is, there will be a hazardous condition created, and then the elimination of that hazardous condition, so long as the room thermostat is still demanding heat?

A. That is right.

Q. And when the room thermostat, of course, moves
795 to open circuit position, both of the other two circuits, that is, the fan circuit and the combustion circuit, are interrupted?

A. That is correct.

Q. Mr. Van Deventer, a few minutes ago you likened the Freeman patent circuit to three circuits, that is, a main circuit or power circuit or line circuit, and then you referred to a couple of branch circuits. Can you and will you now refer to M-H Exhibit 14 and point out just what you meant by a main circuit, a fan circuit and a motor circuit, referring to M-H Exhibit 14?

A. The top wire marked 27, which corresponds to the wire 27 in the patent, is one part of that common circuit.

Q. And its colors?

A. Its colors are alternate red and blue. In the thermostat and extending out from the thermostat contact, or the thermostat contact itself, we have another red and blue circuit, another common circuit, because that contact in the thermostat is common to both the fan motor circuit and the combustion motor circuit.

Now, going on, we first encounter the wire 28; that is a solid blue wire, and that wire, the fan switch 23, the conductor 30, the fan motor 22 and the conductor 32, constitute what I call the fan motor circuit.

796 Then going back to the thermostat contact, in the thermostat 18, we have a solid red wire 29, which together with the limit switch 24, the conductor 31, the combustion motor 35 and the conductor 33 form a circuit which we can term the combustion circuit.

32 and 33, which is one side each of the fan motor and combustion circuits, are connected together to form the bottom wire colored red and blue, which is the other leg of the so-called common circuit.

Q. So that the solid blue wire may be termed the fan circuit?

A. That is right.

Q. And the solid red may be termed the burner motor circuit, is that correct?

A. That is correct. If I just cover up, as I am now doing, the conductor 29, limit switch 24, conductor 31, combustion motor 35 and conductor 33, as I have now done with this piece of paper, your Honor will readily perceive that we have a single circuit, including these two common wires.

Now, if I would put a paper over all of the blue wires, we would then have another circuit going through, which would be all red.

Q. So that you have a common circuit which is col-
797 ored red and blue alternately, which is the line circuit?

A. That is right.

Q. And the full red circuit is the burner circuit?

A. That is correct.

Mr. Freeman: We offer in evidence as M-H EXHIBIT 14 the Freeman patent circuit drawing just referred to by the witness Van Deventer.

(The exhibit was so marked.)

Mr. Freeman: Q. Now, will you turn to page 2 of the Freeman patent and tell us what Freeman there tells the world as to the fan cooling the furnace?

A. I am now reading from line 12, page 2, of the Freeman patent:

"When the circuit is so opened, the damper control operates to check the fire independently of the temperature of the thermostat 18 while the fan motor 22 continues under the control of said thermostat. The fan motor, therefore, continues to operate even though the furnace is overheated

so long as the room temperature is not above the degree which the thermostat 18 is set. The fan 21 thus serves to assist in the cooling of the furnace when the fire has been checked because of overheating."

In the beginning of this, where the patentee states: "When the circuit is so opened," he is referring to the opening of the limit switch 24, which is a thermostatic type of switch, which opens its circuit when a predetermined 798 temperature has been exceeded.

Q. So that the simplified drawing M-H Exhibit 13, as well as the drawing M-H Exhibit 14, support the statement contained in the Freeman patent, "The fan motor, therefore, continues to operate even though the furnace is overheated so long as the room temperature is not above the degree for which the thermostat 18 is set," is that correct?

A. That is correct. These diagrams here are the exact circuits of the Freeman patent. The only physical difference is that in the Freeman patent the two wires 28 and 29 are joined at one point right at the thermostat. I have spread them out a little bit here, so that we can see them; and the wires 32 and 33 are joined at the right hand switch blade of the switch 26, and I have spread them out here a little bit so they will be clear.

These circuit diagrams are identical with the circuits in the patent.

Q. So that when the circuit is open, referring to the limit switch and the combustion motor circuit, it does so, as the patentee states, independently of the temperature of the thermostat 18, is that correct?

A. That is correct.

Q. And it does so, as the patentee states, "while the 799 fan motor 22 continues under the control of said thermostat," is that correct?

A. That is correct. You see, these switches 23 and 24 are separate from each other, in the sense that they can operate independently of each other. If we had two switches here that were either both on or both off at the same time, or one went off while the other one went on, we could not have this sequence of operation.

Q. So that when the limit switch interrupts the circuit of the combustion motor, which checks the rate of combustion, you then have a fan motor in operation under the control of its own fan switch, or under the control of the room thermostat?

A. That is correct.

Q. And so long as the room thermostat is demanding heat, the limit switch can independently, then, of the thermostat start and stop the combustion motor?

A. That is correct.

Q. And any starting and stopping of the combustion motor, does it in any way affect or alter or modify the operation of the fan motor?

A. Only in so far as it changes the heat of the room that operates the thermostat 18. You said in any manner. It does that way, indirectly. If you mean does the operation of that in any manner affect the switch or the cycle, it does not.

Q. So far as the electrical effect is concerned, there is no interconnection of one with the other?

A. None whatever.

Q. They do cooperate, then, following your last answer, when the limit switch opens, checking combustion on account of overheating, the fan switch being closed and the fan operating, does deliver heat from the danger zone or the furnace up to the room?

A. Yes, it does that.

Q. And what does that do with respect to the furnace?

A. Well, that cools the furnace down. You see, the fan in Freeman, being a furnace fan and operating directly on the air, not only moves the heat carrier, the air, up to the room where it is to be used, but also directs that stream of air, that cool air, against the fire pot of the furnace and cools that down materially.

Q. And do you find such statement in the Freeman patent, page 2, line 21, and, if so, will you read it?

A. Well, first, we have that as one of the objects as stated on page 1 there. It says:

"Said control being such as to permit the operation of said accelerating device and to check combustion in case the furnace becomes overheated."

Q. What is the accelerating device referred to there?

A. That is a means for accelerating the air. It is the fan or blower, this same fan we are talking about.

Q. The furnace fan?

A. The furnace fan. On the next page there he says—

Q. Will you give us the line?

A. Line 17. He says:

"The fan motor, therefore, continues to operate even though the furnace is overheated."

Down further on that same page, he says that:

"—the rate of cold air supply is controlled by the operation of the fan."

He is speaking there of the cold air supply in the furnace.

Q. Now, will you read line 21 of the patent, page 2, with respect to cooling of the furnace when the furnace becomes overheated?

A. Yes. That line says:

"The fan 21 thus serves to assist in the cooling of the furnace when the fire has been checked because of overheating."

Q. So that the furnace fan of Freeman located in the furnace serves two purposes, is that correct, or at least two purposes?

802 A. At least two purposes.

Q. And will you tell us rather briefly those two purposes?

A. Well, the first purpose under normal operating conditions is to force or pump the heat carrier, which is the air, through the furnace, that is to say, move the air from the furnace where it is heated, up to the rooms where it is used. That fan is equivalent to a pump in that respect.

The second use is that in the event the furnace should become overheated the fan aids in cooling the furnace in two ways, first, by moving the heated air away from it, and, secondly, by blowing cold air upon it.

Q. Why is it desirable to have a furnace fan or forced air circulation used in connection with the ordinary furnace?

A. Well, if you rely entirely on gravity—and you all know that heated air rises—you have to wait sometime after you have started the fire for the heat to get up to the rooms where it is to be used, and you will get what might be termed a lag in the operation of the system, where by introducing the fan you overcome that lag and you get the heat upstairs promptly as soon as the burner goes on in the cellar.

803 Q. And the temperature has attained a degree high enough so that you do not blow cold air?

A. That is right, operating the fan switch.

Q. And what does Mr. Freeman in his patent on page 1, line 94, say with respect to the fan not operating until the furnace itself has attained a proper temperature?

A. Well, he is here referring to this switch 23, which is

the thermostatic switch, that is to say, operated by temperature, and he says:

"The switch 23 is of a type which closes its circuit only when a predetermined temperature is exceeded. This temperature is so chosen that the circuit within the switch is only completed when the furnace hood has been heated to a temperature greater than normal room temperature. Thus the fan 21 will not be operated if the furnace has not reached a temperature at which the air would be heated above room temperature. In other words, the fan 21 can never operate to force unheated air into the rooms to be heated while this control is in operation."

Q. Mr. Van Deventer, do you have here a physical device or a demonstrator by which you can demonstrate the sequence of operation as taught by Freeman?

A. Yes, I have a demonstrating model that will show that.

Q. Will you please refer to the demonstrating model, which has been marked for identification MH Exhibit 15, and will you explain its sequence of operation, telling
804 the court just what you are doing and what it represents?

A. I believe, your Honor, there will be a photograph of this model introduced shortly in evidence, so I will not for the record make a long explanation of what the device looks like.

But it is a piece of board on which, on the extreme left hand end, I have mounted the casing of a room thermostat, such as 18 in the Freeman patent, but as we have no way of raising or lowering the temperature of the room, I have just put a snap switch in here so I could manually do what the thermostat would do in temperature control.

I wired that thermostat to a device made by Minneapolis-Honeywell Company which incorporates both the fan switch 23 and the limit switch 24 of the Freeman patent, this device being their commercial structure.

The thermostat is this round part, and it sticks out on the extreme right of the demonstrator here. In order to heat that, I have got a little coil of wire here so that we can heat it electrically. That represents any kind of a burner. It might be a coal fire or oil burner, or any other suitable burner.

Now, I have a circuit on here, so that the electric fan,—we have a small one here—can be connected to a circuit
805 with the fan switch 23.

(Witness here demonstrated the model referred to:)

Now, I am turning on the switch or thermostat 18, closing its contact. Your Honor will observe that my heating coil has become red hot, but it is not hot enough yet to make the fan start. You will notice the fan standing still.

Now, you will note, your Honor, the fan is just beginning to run. That switch 23 has closed its contact, because the furnace is hot enough now to drive heat to the room.

806 Q. And in this particular condition both the limit switch and the fan switch are in closed circuit position?

A. That is true.

Q. And the burner is operating and the fan is operating?

A. Yes, the limit switch must be closed or the burner would not operate. Now, I will let it run for a moment or two and your Honor will see that it will get too hot, just as if somebody left the window open by the thermostat; it will get too hot, and when it does get too hot the limit switch will operate.

The Court: It would operate quicker if you put a casing over?

Mr. Freeman: That is right.

The Witness: Now your Honor will observe that the limit switch has operated, opening the circuit to the burner, but that the fan still continues to run. Now I will just assume a temperature here of, say, 300 degrees, and your Honor will observe that if that fan was blowing on this hot end here—and I do not have it do that, because if we ever get it cold we won't be able to get it warm again—but if it was, it would cool it off rapidly, and that is what happens in the Freeman furnace. The fan continues to run, cools the furnace, and at the same time distributes the hot air through the ducts to the room.

807 Mr. Freeman: Q. We will cool it.

A. Now, blowing the fan on there, you will see immediately it brought back the limit switch, the fan continuing to run. We will let this heat for a moment and your Honor will see this fan runs right on and the limit switch keeps going right on and off, on and off, on and off, without having any effect on the fan at all.

Q. Let us move the thermostat manually to the position where it would move if the room temperature was satisfied, then what would happen?

A. I will assume somebody closed that mythical window I have been talking about, and now your Honor will observe the burner is extinguished and the fan is stopped.

That is one of the sequences of operations in the Freeman patent and illustrates that important feature thereof which has to do with eliminating the dangerous overheating of the furnace.

Mr. Freeman: We offer the demonstrating model just referred to by the witness Van Deventer in evidence as M-H EXHIBIT 15.

(The exhibit was so marked.)

Mr. Freeman: I would like to offer in evidence a photograph of the demonstrating model M-H Exhibit 15 as
808 M-H EXHIBIT 16. Is there any objection, Mr. Moore, to the photograph?

Mr. Moore: No.

Mr. Freeman: It is a photograph of the physical device.

Mr. Moore: No objection.

(The exhibit was so marked.)

The Court: You do not have the fan in this photograph.

Mr. Freeman: No, the fan is not in the photograph. I have another one, your Honor, that will explain that.

Q. Mr. Van Deventer, I hand you another photograph corresponding to the M-H Exhibit 16 except in color. Will you briefly explain it and compare it with M-H Exhibit 15, and also with respect to the fan connection found in M-H Exhibit 15?

The colored photograph will be marked for identification M-H EXHIBIT 17.

(The photograph was so marked.)

A. In response to this M-H Exhibit 17 I will first compare it with M-H Exhibit 13, the so-called sequence drawing. The colors in M-H Exhibit 17 are the same as the corresponding colors in M-H Exhibit 13. The numerals in the M-H Exhibit 17 are the numerals of the Freeman patent.

809 In respect to 25 and 26 in the patent, those represent a switch, a knife switch, and a pair of wires over at the extreme left of the patent. In 25 that is the cord that connects to the source of current supply, and 26 is a slip plug.

The other difference in this M-H Exhibit 17 from the patent is that I have mounted an ordinary socket so that we could connect an ordinary electric fan at the point 22 in the photograph, and that, of course, represents the connection of the motor 22 in the Freeman patent.

Also I have in the M-H Exhibit 17 a coil of wire termed a combustion accelerator, which represents the motor 35,

and its associated apparatus, constituting the combustion accelerating apparatus of the Freeman patent.

Q. I notice on these photographs, that is, particularly the photograph M-H 17, the words "Fan Connection." Will you please explain why those words were put on?

A. I marked that fan connection so that anyone using the physical exhibit would know that they should plug the fan plug into that socket. As I have testified, this represents the connection for the wires for the fan 22 of the Freeman patent. It is just a physically convenient way of connecting up the fan which would otherwise make a cumbersome addition to the physical model Exhibit 15.

Q. And have you in Exhibit 17, so far as the colored wires are concerned, followed the colored wires, which are found in M-H Exhibit 14?

A. Yes; the photograph Exhibit 17, the physical device Exhibit 15, and the two charts marked for identification Minneapolis-Honeywell Nos. 13 and 14, are all colored alike. They all correspond to each other.

Q. I think you are in error, Mr. Van Deventer, with respect to these charts M-H Exhibit 14 and M-H Exhibit 13 as being colored the same as the photograph Exhibit 17.

A. Then I correct my testimony. I thought these were the charts. We have several here. Upon re-examination of the charts 13 and 14, I found that the coloring is not the same as in the photograph M-H 17. The circuits are the same. The coloring is not. The coloring of the wires is not exactly the same.

Q. Even at the risk of repetition, so the record is clear, do you find the colors appearing on M-H Exhibit 17, so far as the wires are concerned, to correspond with the colors on the wires of the physical model M-H Exhibit 15?

811 A. Yes, I do.

Q. Now, do you have a physical model to demonstrate the sequence of operation of the M-80, the Mercoid control, and will you make such a demonstration, using the same fan that was used in connection with your demonstration of M-H Exhibit 15?

I might say, your Honor, that Exhibit M-H 18 for identification includes a physical device made by the Mercoid Company, which it has conceded was made by it, and which has heretofore been referred to in connection with the taking of the depositions of both Mr. McCabe and Mr. Courdeol as M-H Exhibit 1.

(The instrument was so marked.)

Q. Will you now, Mr. Van Deventer, run through the sequence of operation in so far as the Mercoid device now exemplified in its entirety as M-H Exhibit 18 is concerned?

A. This model Exhibit No. 18 is constructed in substantially the same manner as the Exhibit 15. In fact, if I just repeated what I said about Exhibit 15 I would be telling the court about this model. For the record, I would say that I have taken a board and upon that I have mounted a plug at the extreme left hand corner here, which is the equivalent of the switch 26 of the Freeman patent, and
812 from that plug extend the wires to the rest of the apparatus.

In this model I have used a Mercoid Sensatherm room thermostat of the type shown in 18 of the Freeman patent, but I have used a manual switch in that thermostat so I could operate it, and the wires connect to this Mercoid switch type M-80. We have here the same little coil of heating wire and the same plug for the connection of the fan 22.

Q. And now will you turn on the switch, the equivalent of the room thermostat closing, and just briefly go through the sequence of operation, telling what happens.

A. Well, everything now being cold I am turning on the thermostat switch. Your Honor will observe that the heater lights and that the fan is off, the furnace being cold. If your Honor could look in the end of the M-80 switch you would see this coil gradually turning under the action of the heat.

The Court: I can see it.

A. And now your Honor will notice the fan has started to operate while the heater is on. Now assuming that the thermostat continues to demand heat, we will soon have a condition here in the furnace where it will be overheated.

813 Mr. Freeman: Q. So that even though the room thermostat is still demanding heat, the limit switch will open, the fan switch will remain closed, the fan will continue to operate, and the burner will stop operation, is that correct?

A. That is correct. Now your Honor will observe the heater is extinguished and the fan continues to run. If you will bring that fan here and blow it on the thermostat we will demonstrate how the fan would cool the heater. You will observe that the thermostat cooled down, and when

it did, the limit switch 24 operated to turn on the heater, the fan still continuing to run.

Q. Now, will you put the demonstrating apparatus in the condition it would be in when the room thermostat moved to open circuit position or satisfied positions?

A. Yes. I am now doing that by turning off the switch in the thermostat, whereupon both the heater and the fan cease to operate.

Mr. Freeman: We offer in evidence as DEFENDANT'S EXHIBIT M-H 18 the demonstrating model just referred to by the witness Van Deventer, and included with Exhibit 18 will be the same fan used in connection with the demonstration of M-H Exhibit 15, a single fan having been used for demonstrating purposes of both devices.

814 (The exhibit was so marked.)

Mr. Freeman: We offer in evidence as M-H EXHIBIT 19 a photograph of the physical model of the Mercoid M-80.

(The exhibit was so marked.)

Mr. Freeman: We also offer in evidence as M-H EXHIBIT 20 a colored photograph of the demonstrating model M-H Exhibit 18.

The Court: They may be received.

(The exhibit was so marked.)

The Court: Take a short recess, gentlemen.

(Whereupon a short recess was had, after which the proceedings were resumed as follows:)

Mr. Freeman: We offer in evidence as M-H EXHIBIT 1-A a bulletin published by Mercoid in May of 1940 in the amount of five thousand, Form L-4, entitled, "Installation Instructions."

And we offer in evidence as M-H EXHIBIT NO. 3 a group of drawings reproduced from illustration No. 8 appearing in M-H Exhibit 1-A. These two exhibits, your Honor, were both referred to in the McCabe deposition, and I am going to have the witness Van Deventer refer to them and I am offering them at this time, and I understand there is no objection.

Mr. Moore: None whatever.

815 (The exhibits were so marked.)

Mr. Freeman: Q. Mr. Van Deventer, will you quickly refer to M-H Exhibit 3, starting with the top drawing, entitled, "Illustration 8," and then run through the several positions referred to in the drawings to give us rather quickly the sequence of operation of the M-80 as

recommended by the Mercoid Corporation in its illustration No. 8?

816 A. I have here an enlarged chart on the easel showing this sequence of operation, and this has been broken down into seven positions that will give us the various sequences through which the apparatus goes.

Q. Mr. Van Deventer, will you please at this time refer to M H Exhibit No. 3 and explain the sequence without referring to the claim?

A. Now, we have the first sheet, entitled, "Position 1," where the room is warm and the furnace is cold, and in that position with the room thermostat off, the circuit is open, so that this relay, which is shown here, is de-energized, the limit switch is closed as the furnace is cold, and the fan switch is open for the same reason. The stoker motor is not operating and the fan is off; it is not operating.

Q. That is position No. 1 where the room is warm and the furnace is cold?

A. That is correct.

Q. Now, what next happens with respect to the room still being cold and the furnace cold, or position No. 2?

A. Well, here the thermostat has closed its contact. It has begun to demand heat, and the relay here is energized, the limit switch remains closed because the furnace is cold, and the fan switch is open for the same reason, but the

817 stoker motor has been energized. The fan, however, has not yet started to operate, because the furnace is too cold to permit it.

Now we go to position No. 3, where the room is still cold and the furnace has warmed up. The room thermostat is still on and still calling for heat, the relay is energized and the limit switch is closed and the fan switch is closed because the furnace has gotten warm enough to close it. The stoker motor is still running and the fan motor is running.

Q. So that in position No. 3 you have a situation where the limit switch permits the burner to run and the fan switch permits the fan to run?

A. That is correct.

Q. And that would be normal operation where the furnace fan is delivering heat to the room in order to endeavor to satisfy the room thermostat, is that correct?

A. That is right.

Q. Now, what happens as the furnace goes from a warm position or condition to a hot or abnormal or excessive temperature condition?

A. Well, that would be position 4, where the room was cold and the furnace was hot. The room thermostat is still on, it is demanding heat and the relay is energized
818 but the limit switch is opened and that has shut the stoker off. The fan switch, however, remains closed so that the fan continues to operate and cool down the hot furnace. So here we have a condition where the stoker motor is not running, the fan motor is running, the limit switch is open and the fan switch is closed.

Now, the next position, which we call position 5, is where the room is cold and the furnace is warm. It has cooled down somewhat from position 4, and here the room thermostat is still on, still asking for heat, the relay is energized, but the furnace has cooled down sufficiently to let the limit switch close, and, of course, that turns on the stoker motor again. Now, the fan switch, which has been closed all the while, is permitting the fan motor to run, that circuit being closed.

Then we go to position 6 where the room is warm and the furnace is warm. At last the room has gotten warm enough to cause the room thermostat to open its contacts. That deenergizes the relay, and while the limit switch is closed and the fan switch is closed, both the stoker motor and the fan motor are not running.

Now, we get back to position No. 7, which is with the room warm and the furnace cold, and we have exactly the same condition that I outlined in connection with position 1;
819 that is to say, we have the room thermostat off and the relay deenergized and the limit switch is closed and the fan switch is open, and the stoker is off and the fan is off. That is a complete sequence of operations through the various cyclic conditions which the Freeman controls permit.

" Q. And the sequence of operations that you have described in connection with illustration No. 8 has to do with a Mercoid fan and limit control type M 80 as illustrated in the Mercoid installation instructions, Exhibit 1 A, is that correct?

A. Yes.

Mr. Freeman: Mr. Moore, I might save a lot of time if you will concede, or at least tell me whether or not the sequence which is here outlined is a proper sequence of operation of the M 80 as illustrated in the wiring diagram hook-up illustration No. 8 of the Mercoid Bulletin.

Mr. Moore: I consider that is a very fair illustration.

Mr. Freeman: Thank you. Now if I can get you to do the same in connection with illustration No. 7, which likewise appears on one of the bulletins, Bulletin 1-A.

At this time I would like to offer in evidence as M-H EXHIBIT 1-B an installation instruction bulletin known as Form P-55-A published February, 1940, by The Mer-
820 coid Corporation.

(The exhibit was so marked.)

Mr. Freeman: We offer in evidence as M-H EXHIBIT NO. 2-A, a group of drawings referring to illustration No. 7, which is a reproduction of the wiring hook-up or circuit for the M-80 as recommended by Mercoid Corporation, and as disclosed in its bulletin M-H Exhibit 1-A.

Mr. Moore: No objection, your Honor.

(The exhibit was so marked.)

Mr. Freeman: And will you state likewise that the drawings illustrate a proper or fair sequence of operation?

Mr. Moore: They do.

Mr. Freeman: I might state, your Honor, these are all drawings that have already been gone into in connection with the examination on behalf of Minneapolis-Honeywell of Ira E. McCabe of The Mercoid Corporation, and I think if I could get Mr. Moore to agree, I will not have to have Mr. Van Deventer go through the entire sequence, unless the court would like to hear more about different hook-ups.

The Court: I am content.

Mr. Freeman: We offer in evidence as M-H EXHIBIT 4 a group of drawings illustrating a sequence of opera-
821 tion for the Mercoid control as referred to in Mercoid's Bulletin P-55-A, dated February, 1940, M-H Exhibit 1-B.

Mr. Moore: No objection.

(The exhibit was so marked.)

Mr. Freeman: And likewise, Mr. Moore, the sequence of operation as exemplified in the drawings is a fair and accurate representation?

Mr. Moore: It is.

Mr. Freeman: Q. Now, Mr. Van Deventer, I call your attention to a drawing and a claim block which we will mark for identification as M-H EXHIBIT 21.

(The document was so marked.)

Mr. Freeman: Q. And I will ask you to compare claim 4 with the illustration applying first the various elements of the claim and then likewise calling attention to the colored portions of the circuit with respect to like colored

portions found in the claim block. I am talking about the drawing which is a reproduction taken from M-H Exhibit 1-A.

A. I am now testifying as to Minneapolis-Honeywell Exhibit 21; the colored drawing to which I refer appears on the left.

The Court: Just a minute. Why is position 6 different from position 6 of M-H 3-F?

822 Mr. Bair: That is Minneapolis-Honeywell Exhibit 3 and 3-F is the sixth sheet.

The Witness: Will you read the question, please?

(The question was read by the reporter as above recorded.)

The Court: Why is position 6 of M-H Exhibit 2-F different from position 6 of M-H Exhibit 3-F?

823 A. In one of the thermostat controls everything. In the other one the thermostat is so arranged it controls only the burner. If your Honor will look at the one in illustration No. 7, look on the first sheet of that.

Mr. Freeman: Q. Of which exhibit?

A. Position 6 of Exhibit 2. You will notice the fan motor and the fan switch are bridged directly across.

The Court: Q. Let me get this. Is there a room thermostat there?

A. Yes, that is up in the upper part. It is called the Sensatherm, type H; connected to that stoker control immediately below it, but that is only in the burner circuit.

The Court: I see.

A. If you will look at Exhibit 3, position 6, you will see the thermostat is ahead of everything with respect to the line and controls not only the burner motor but also the fan motor as well.

Mr. Freeman: I think those positions will be brought out a little clearer, your Honor—

The Court: Q. What was that last part, Mr. Van Deventer?

A. That in Exhibit 2, position 6, the thermostat controls—

824 Q. No. What about the other one?

A. In Exhibit 3, position 6, the thermostat controls both the fan and the stoker motors. It is ahead of everything.

The Court: I see.

Mr. Freeman: I was going to say perhaps that will be brought out a little bit better under the application of the

claims where in claim 4 the thermostat does operate to do a job and claim 1 does not refer to it.

The Witness: Perhaps it would help us, your Honor, to know the M-H 3 is the sequence drawing, Exhibit 13 or 14.

Mr. Freeman: Q. Will you now refer to M-H Exhibit 21 which illustrates the Mercoid control hook-up for stoker fired warm air furnace equipped with forced circulation fan, which hook-up is reproduced on M-H 1-A, which is a Mercoid bulletin, and apply claim 4 as illustrated in the claim-block to the hook-up?

A. I am now testifying with respect to Exhibit 21. We have in claim 4 an introductory clause, in a furnace control, which is shown in this diagram at the left of the exhibit. The first element is apparatus for controlling the rate of combustion, and that would be the stoker motor, which I have colored yellow. The second element of the claim
825 is the apparatus for controlling the rate of supply of a heat conducting medium, and that is the fan motor, colored green in the diagram, which controls the rate of supply of the air, which is the heat conducting medium. Then, we have as a third element the thermostatic apparatus, which is colored blue in the diagram, which is (A) responsive to furnace temperature; and connections between said control apparatus and said thermostatic apparatus, which connections I have colored yellow and white in the diagram, by means of which (B) said control apparatus operates to check combustion, while supplying said medium (C) when furnace temperature exceeds a predetermined degree. That is what the switches colored blue do. They operate to check combustion by cutting out the stoker motor when the furnace temperature exceeds a predetermined degree. The fan switch, however, which is part of this control apparatus, permits the fan to operate while the limit switch is open, permits the fan to continue "supplying said medium" as stated in the claim, when the furnace exceeds a predetermined degree.

Then, as a fifth element we have other thermostatic apparatus, which is colored in purple on the diagram, which is (D) responsive to the temperature of the object to
826 be heated, which is the room in which this thermostat designated as "other thermostatic apparatus" is located, that being the room thermostat 18 of the patent.

The sixth element of the claim is the connections between the said control apparatus and said last mentioned thermostat apparatus, which connections I have colored black

in the diagram, by means of which (E) said control apparatus operates to check both combustion and the supply of said medium when said object is above a predetermined temperature irrespective of the furnace temperature. In other words, when the room is above a predetermined temperature, and the thermostat 18 opens, the control apparatus operates to check both combustion, the stoker motor, and to supply the said medium, the fan motor, as long as the room is at that degree of temperature, and independent of the furnace temperature.

So that I find on this diagram, on the left of Exhibit 21, all of the elements of the claim operating in the sequence called for in the claim.

Q. I now place over the claim block of Exhibit 21 a claim block referring to claim 9 of the Freeman patent, and I will ask you to compare the claim block 9, which we
827 will mark for identification M H EXHIBIT 22, with the illustration appearing upon M H Exhibit No. 21. (The drawing was so marked.)

A. This claim starts off with the introductory clause, in a furnace control, the combination of, and has as its first element an electrically operated combustion control apparatus, which is the stoker motor, which I have colored orange, (A) adapted to accelerate combustion when supplied with electric power, and this motor is so adapted, and (B) to check combustion when not so supplied, and this motor so operates.

As a second element of the claim, a motor driven fan for controlling the supply of air to be heated, and that is the fan motor, colored green in the drawing.

The third element is a source of electric power, and obviously we have one connected to the apparatus shown in the drawing, which is designated "hot line" at the extreme left of the drawing.

And the fourth element is electric circuits for connecting said power source (C) to said control apparatus; I have colored those circuits black and white, and (d) the motor of said fan, which I have colored black and yellow.

828 And a fifth element is the thermostatic apparatus interposed in said circuit, and I have colored the thermostat apparatus which comprises the fan and limit switches blue in the diagram, (E) responsive to furnace temperature, and both the fan and limit switch are so responsive, and (F) adapted to interrupt the circuit to said combustion control apparatus, which is the stoker motor,

(G) while completing the circuit to the motor of said fan, which is what occurs here, (H) when furnace temperature is above a predetermined degree. In other words, the fan circuit here is completed while the stoker motor is operating, and while the limit switch is above a certain predetermined degree. And other thermostatic apparatus interposed in said circuit, which is the room thermostat 18 of the patent, or Mercoid Sensatherm, type TV-2, shown on the drawing; (I) in series connection with said first mentioned thermostatic apparatus, (J) responsive to the temperature of the space to be heated, and (K) adapted to interrupt the circuits to both said combustion control apparatus and to the motor of said fan, when said last mentioned temperature is above a predetermined value. The last mentioned temperature referred to is the room temperature mentioned under (J) preceding.

829 So that we have in this drawing, Exhibit 21, all of the six elements set forth in claim 9 arranged in the sequential operation there specified.

830 Mr. Freeman: I offer in evidence as M-H EXHIBIT No. 22 the claim block of claim 9 of the Freeman patent.

(The exhibit was so marked.)

Mr. Freeman: Q. Now, Mr. Van Deventer, I ask you to compare claim 1, which likewise appears upon a claim block, and I will ask you to compare it with the illustration or hook-up shown on M-H Exhibit No. 21.

A. Perhaps it would shorten this somewhat to say that claim 1 is merely the first four elements of claim 4, to which I have just referred. Whatever I might say with respect to claim 1 would merely be repetition of what I stated with respect to the first four elements of claim 4.

Q. You agree with Mr. Black, who yesterday stated that claim 1 read upon a type of hook up as exemplified now in M-H Exhibit No. 21?

A. Yes.

Mr. Freeman: There is no question about that, is there, Mr. Moore?

Mr. Moore: You are asking me?

Mr. Freeman: If the statement was made yesterday by Mr. Black that claim 1 read upon the type of device or hook-up which was exemplified in M-H Exhibit 21, and likewise illustrated in the installation instructions sent

831 out by Mercoid 1—A.

Mr. Moore: I imagine it would be shown by the

record. I don't know whether he testified to this particular exhibit or not.

Mr. Freeman: As far as the type of hook-up?

Mr. Moore I imagine so.

Mr. Freeman: The illustration.

Q. Mr. Van Deventer, will you briefly run through the four elements and do it rather hurriedly?

A. This claim 1 starts with introduction in a furnace control. So obviously, there could be other things here than what is in the claim. We have as the first element, apparatus for controlling the rate of combustion, that is the stoker motor, colored orange. We have as a second element, apparatus for controlling the rate of supply of a heat conducting medium, that is the fan, and its motor, colored green.

We have as a third element, thermostatic apparatus, which is the fan and limit switch, which I have colored blue, (A) responsive to furnace temperature, and the fan and limit switch are so responsive, and the fourth element, connections between said control apparatus and said thermostatic apparatus by means of which (B) said control apparatus operates to check combustion while supply-
832 ing said medium, when the furnace temperature exceeds a predetermined degree.

That means when the limit switch opens to check the operation of the stoker motor, the fan switch continues the operation of the fan motor to supply the medium, the air, when the furnace temperature exceeds a degree of temperature at which the limit switch opened.

So we have in claim 1, or in the drawing, rather, Exhibit No. 21, all four of the elements of claim 1 of the Freeman patent, arranged to operate in the sequence called for in the claim.

Q. I call your attention to a chart marked M H Exhibit 23, and I will ask you to state, first, how the drawing thereon compares with the drawing No. 2403 in M H Exhibit 10, which is the Mercoid wiring diagram?

(The chart was so marked.)

A. I have made a comparison of the drawing in the Mercoid booklet, Exhibit 10, with this drawing you have just handed me, Exhibit 23, and I find Exhibit 23 is an exact copy of that drawing.

Q. With parts colored?

A. That is correct.

Q. Now, will you make a comparison of claim 1 of the

Freeman patent, using the chart, which has a claim 833 block thereon, and compare it with drawing No. 2403, which is a reproduction of a wiring diagram taken from Mercoid wiring diagram bulletin, M-H Exhibit 10?

A. I am now testifying with respect to M-H Exhibit No. 23. I find shown in this drawing, which shows the furnace control, which has the introductory clause of claim 1 of the Freeman patent; the first element, the apparatus for controlling the rate of combustion, which is the oil burner motor, colored orange in the diagram, and corresponding to the motor 35 of the Freeman patent.

The second element of the claim is apparatus for controlling the rate of supply of a heat conducting medium. That is colored green in the drawing, and is marked "fan motor" in the drawing, and that corresponds to the fan motor 22 of the Freeman patent.

I find a third element entitled "thermostatic apparatus," which I have colored blue in the drawing, and where it is marked "combination fan and limit control type M-80," and I find this to be the fan switch 23, limit switch 24, of the Freeman patent.

The claim states this thermostatic apparatus is (A) responsive to furnace temperature, and the diagram shows that it is so responsive, as it is mounted in the top of the hood of the furnace, and so mounted in the Freeman 834 patent.

And the fourth element of the claim is the connections between said control apparatus and said thermostatic apparatus, which connections I have colored yellow and white, by means of which (B) said control apparatus, that is to say, fan and limit switches, operates to check combustion, which it so does, while supplying said medium, which is the heat conducting medium, the second element of the claim, (C) when furnace temperature exceeds a predetermined degree. And I find these connections in the drawings and in the Freeman patent. So that we have in the drawing, Exhibit 23, all of the elements of claim 1 that appear in the patent, arranged to operate in the sequence therein defined.

Q. So that the control apparatus referred to as the fourth element of the claim, which operates to check combustion and at the same time supplying the heat conducting medium when the furnace temperature rises, is the combination fan and limit control type M-80, illustrated in drawing No. 2403, is that correct?

A. That is correct.

Q. Is that likewise represented here by the physical device, M-80, Mercoid Exhibit PPP?

A. Yes.

Q. And likewise by the physical device, the M H 835 Exhibit 1, which now forms part of the demonstrator, M-H-18, which you demonstrated to the court this afternoon?

A. Yes.

The Court: How much more time do you think you will take?

Mr. Freeman: With respect to Mr. Van Deventer I think it will take over an hour. We have some witnesses coming in, that I have not had an opportunity to talk with, with respect to the Time-O-Stat controls, and I can't say.

The Court: Have you any idea?

Mr. Freeman: I think I am going to be through tomorrow, sure. As to Mr. Moore's cross examination, I don't know about that.

The Court: Do you expect to take much time when Mr. Freeman rests?

Mr. Moore: I don't believe so, your Honor.

The Court: What are your desires with respect to the argument in this case?

Mr. Freeman: As far as I am concerned I would like to argue it when we are through.

Mr. Moore: I prefer to submit this on briefs, briefs on both sides, and oral argument then if you care to hear it.

836

The Court: How much time do you want?

Mr. Moore: I would want about three weeks to prepare the briefs.

Mr. Freeman: I find I do a better job while I am still full of the particular circuits, and I would much prefer to argue it when we are through with the testimony. I leave it, however, to the court. Whatever the court wants, I am perfectly willing to do.

Mr. Moore: The only reason I would like to write a brief, your Honor, is that it is more than a question of just circuits, more on the question of the contributory infringement. Mercoid has made some charges about expanding the scope of the patent and violation of the anti trust laws. We haven't discussed that question very much. The evidence is before the court. As there are five questions that are raised, laches, non-infrigement, invalidity, expand

ing the scope of the patent, and combination in restraint of trade, I would like to do that in printed form, making separate divisions. It is rather hard to do that in an oral argument unless you take about a day's time.

The Court: What I dislike to do is to let this matter get cold so that I have to spend hours and hours getting back to the place where I am today.

837 Mr. Freeman: I am with the court in that respect.

The Court: If it can't be done, why, it can't be done. If it can be done, if after we conclude the evidence in this case—I have a little patent case, a jury patent case, which I think will take about two days—and if you gentlemen can get ready and enlighten me on all these issues, I don't mind spending a day, because I would otherwise spend more than a day really, I would spend nights and Sundays, to get back into my mind what I have tried to get into my mind the last week.

Mr. Moore: Could we have oral argument a week from Monday?

The Court: You mean to hear it after the jury case?

Mr. Moore: That will give us about four or five days to get our decisions lined up.

The Court: I will plan on you gentlemen arguing this case orally after the conclusion of the first case to follow this.

Mr. Moore: Very well, sir.

Mr. Freeman: Your Honor has no objection if we want to split up our time in the argument so that Mr. Bair takes a portion of it?

The Court: I don't care anything about that. I do want both parties to argue the case so that they feel they

838 have presented to the court everything that should be presented. We will take all the time necessary to do that. I am not inviting you to waste any time, but I want you to say to me everything that you think should be said on behalf of your respective clients.

839 *Direct Examination (Continued) by Mr. Freeman.*

Q. Yesterday at the close you were talking about the sequence of operation of the hook-up referred to as drawing No. 2403, illustrated in the Mercoid Bulletin M-H Exhibit 10 and also illustrated in the M-H Exhibit 22. I now ask you as to what the bulletin says in connection with the sequence of operation or how does the bulletin explain

840 what is to be done and how does it compare with the sequence that you described or explained last evening?

A. This bulletin Exhibit 10 in describing the operation of that circuit shown in drawing No. 2403 therein describes the sequence of operation which I have described in connection with the Exhibit No. 23 and, in particular, respecting the operation of the limit switch with relation to the fan circuit the booklet says:

"Should the furnace at any time reach the temperature at which the limit control is set, the limit switch will open its circuit and stop the burner, but the circulating fan will continue to operate. When the furnace temperature is restored to normal, the limit switch will automatically close again to start the burner."

Q. What does the booklet say as to the controls to be used in order to get the type of operation therein explained in words?

A. It says in connection with the description of this drawing 2403:

"If above hook-up is desired following controls should be ordered:

"One (1) type H Mercoid Sensatherm 55 to 85 degrees;

"One (1) type JMI Pyratherm;

"One (1) type M-80 Mercoid combination fan and 841 limit control.

"When ordering specify voltage and cycle of line."

Q. How does the wiring diagram, drawing No. 2403, M-H Exhibit 23, compare with illustration No. 7?

A. It is the same except that the Exhibit 23 is colored. The position of the operating parts are the same and in the illustration No. 7 there has been added a so called summer switch for the fan, which has no effect on the sequence of operation that we are discussing.

Q. Will you now apply Claim 6 to M-H Exhibit 23, the illustration thereon, drawing No. 2403, using the claim block chart M-H Exhibit 24 for that purpose?

A. Claim 6 of the Freeman patent has the introductory clause of the furnace control, which is shown in Exhibit 23, and the first element of the claim is an electrically operated combustion control apparatus adapted (A) to accelerate combustion when supplied with electric power and (B) to check combustion when not so supplied.

That is the oil burner motor colored orange in the drawing.

The second element of the claim is a motor driven fan

for controlling the supply of air to be heated. That is the fan motor so marked in the drawing and colored green.

842 .The third element of the claim is a source of electric power, and that source of electric power is shown connected to the line switch so marked in the drawing.

The fourth element of the claim is electric circuits for connecting said power source to (C) said control apparatus and (D) the motor of said fan.

These circuits are shown in the drawing 2403, Exhibit 21, and are colored black and white and black and yellow respectively.

The claim recites as the fifth element thermostatic apparatus interposed in said circuits (E) responsive to furnace temperature and (F) adapted to interrupt the circuit to said combustion control apparatus (G) while completing the circuit to the motor of said fan (H) when furnace temperature is above a predetermined degree.

This thermostatic apparatus I find in the drawing Exhibit 23, and it has been colored blue. It comprises the combination fan and limit-motor type M-80 and it is responsive to furnace temperature as called for in E of the claim. It is adapted to interrupt the circuit of said combustion control apparatus as called for in F of the claim, while completing the circuit to the motor of the fan and called

843 for in G of the claim, when the furnace temperature is above a predetermined degree as called for in H of the claim

So I find in the drawing Exhibit 23 all of the elements of the Claim 6 of the Freeman patent arranged to operate in the sequence therein claimed.

Q. Does Claim 6 apply in the same manner as illustration No. 7 which is shown in Mercoid's Bulletin M-H Exhibit 1-A?

A. Yes, it does.

Q. You have already applied Claim 1 to M-H Exhibit 23 and I now ask you if Claim 1 applies to the type of device or hook-up wherein an M-80 is used, as disclosed in illustration No. 7, forming a part of a Mercoid bulletin as an exhibit here numbered M-H 1-A?

A. Yes, it does.

Q. And it applies in the same manner as your application of claim 1 to drawing No. 2403, is that correct?

A. That is correct.

Q. Have you made a comparison of illustration No. 8,

also shown in a Mercoid bulletin in evidence as M-H Exhibit 1-A, with claim 6 of the patent, and does it apply?

A. Yes, I have made such an application, and that 844 claim does apply to that illustration.

Q. Mr. Van Deventer, would it make any difference in so far as the sequence of operation and in so far as the application of Claim 6 of the Freeman patent to a device or hookup as illustrated in M-H Exhibit 23 wherein the fan operated at two speeds instead of one speed?

A. None at all.

Q. As to each of the claims that you have here applied to the various charts, particularly claims 1, 4, 6 and 9, would you give a like answer if you were asked with respect to each of those claims and their applicability to a hook-up where the fan operated at two speeds instead of one?

A. My answer would be the same as to all of the claims.

Q. And would each of these claims apply to hook-ups wherein an M-80 was used, as illustrated in the illustrations that you have here referred to, if in addition to a fan control and a limit control there was some auxiliary switch known as a summer switch, which might be turned manually to change the sequence of operation?

A. Yes, such an addition would be simply something added. It would not change the sequence as claimed and described.

Q. And as to whether or not there was some manual 845 switch incorporated as part of the switch mechanism or mounted in the same casing?

A. No, that would make no difference.

Q. That is just an added part?

A. That is all.

Q. And so long as it played no part in the operation of the fan or limit control, it would have no bearing on the sequence of operation?

A. None whatever.

Q. And Claims 1, 4, 6 and 9 would thus apply?

A. That is correct.

Mr. Freeman: We offer in evidence as M-H EXHIBIT 24 the claim block of Claim 6.

(The exhibit was so marked.)

Mr. Freeman: You may cross-examine.

Cross-Examination by Mr. Moore.

Q. Mr. Van Deventer, I believe you agreed mainly with the description that Mr. Black made of the Freeman patent, did you not?

A. That is correct, as far as he went.

Q. That is a system patent, is it not?

A. Yes.

Q. And the system is a system for controlling the
846 temperature within a dwelling, is that right?

A. That is correct.

Q. And that system includes a furnace—this happens to be a hot air furnace—with a hot air chamber at the top, where air is brought in and passed through to the hot air chamber and then up to the rooms?

A. That is right.

Q. Without that hot air furnace you would not have a heating system, would you?

A. Not in that disclosure.

Q. And there is a fan for circulating that air through the heated furnace up to the rooms?

A. Yes.

Q. This is an automatic heating system, so you employ a room thermostat to start and stop the operation of a coal stoker or a motor draft damper arrangement, is that correct?

847 A. That is correct. Sometimes it does more than that, but, as you have seen—

Q. Well, I have not gotten to the rest of it.

A. I agree with you.

Q. So you have in your heater system, your furnace, your coal supply or coal stoker or your motor for operating the drafts, all controlled by a thermostat, is that correct?

A. Yes.

Q. They are all parts of the heating system?

A. That is right.

Q. And they are essential to the heating system, if it is going to be an automatic heating system?

A. That is right.

Q. Do you agree with Mr. Black that there is nothing in the Freeman patent that discloses any particular type of room thermostat?

A. That is correct.

Q. I might use the old Figure 21, such as the Mercoid describes in its catalogs, and it would operate in the same manner?

A. Yes.

Q. Now, you also have a limit switch 24, which controls the operation of the coal stoker or draft motor, and you
848 agree with Mr. Black that there is no particular type of limit switch specified in the description of the Freeman patent?

A. Oh, no, not at all. He is very definite as to what he describes.

Q. What did he describe?

A. He describes a thermostat switch responsive to temperature.

Q. Was that all?

A. Why, I think so. I can read you from the patent, if you like, what he describes.

Q. Please do.

A. He says, referring to what we have termed the limit switch:

"The switch 24 is of the type which opens its circuit when a predetermined temperature has been exceeded. This temperature is so chosen that the circuit within the switch is opened when the furnace has been heated to such a point that further heating might prove dangerous."

I am reading from line 6 to line 12, inclusive, page 2 of the Freeman patent.

Q. I show you a Mercoid Figure 50 instrument, which is illustrated and described very clearly in the various publications, and I ask you, does this Figure 50 Mercoid
849 warm air furnace control answer the description that you have just read?

A. I think, without making a detailed examination of this, unless Minneapolis-Honeywell counsel wishes me to, that I could say that is a temperature responsive device, and in so far as I have read would be the switch 24 of the Freeman patent, so far as the instrumentality is concerned.

Q. And have you looked at the Mercoid Exhibit 000, which is the M-51 limit control?

A. I think the same answer would apply, but in order that we do not get confused as we go along I want to point out that both of those switches to which you have directed my attention are single circuit individual switches; they are open in one position and closed in another. They are not like some of the two-circuit switches we have.

Q. No.

A. I wanted to get that clear.

Q. That is the same type as employed in the Freeman patent, is it not?

A. That is correct.

Q. Now, you also have what we have termed a furnace fan switch. You have in this heating system a circu-
849 lating fan, and that is an electrically operated circulating fan, and I believe the patent describes and Mr. Black also stated that 23 was a furnace fan switch which closed on a rise in temperature, so that the circuit would not be completed through the fan to blow cold air in through the building.

Now, is there any particular type of switch designated as 23 described in the Freeman patent?

A. The same type of thermostatic switch as 24 with the contacts reversed so that it will open on a fall of temperature.

Q. Now, are you familiar with the Figure 50 which has been stated in the various literature introduced by Mercoid and as stated in the Peninsula Oil Burner correspondence, Mercoid Exhibit CCC, in which it is stated that Figure 50 with a reverse tube will accomplish this job when he asked for a furnace fan control,—would that be the same general type of two-circuit instrument as the furnace fan control such as used or described in the Freeman patent controlling the operation of the fan?

A. Will you read that question again? There was one part of it I did not catch.

(Mr. Moore's last question was read as above recorded.)

851 A. I do not understand what you mean by "two-circuit instrument." This device here will either open a circuit or close a circuit.

Q. I am sorry I used that term. It is the same general type that closes a circuit in one position and opens a circuit in another?

A. That is correct.

Q. Now, have you looked at the Mercoid Figure M-53, Mercoid Exhibit 000-2? I ask you if that is the same general type of instrument that can be used as a furnace fan control?

A. Yes.

Q. So that you have then the element 23 and the element 24, both exemplified in the Mercoid Figure 50, and with the Mercoid Figure 50 with the tube reversed or the Mercoid M-51 or M-53. Now, I believe the accused device

or the device that Minneapolis-Honeywell is charging to infringe or contribute to the infringement of this patent is merely a combination of the M-51 and M 53, is that correct?

A. No, I cannot go along there at all.

Q. Now, what is the difference?

A. Well, I think that Mercoid has a number of patents on features of this control, and I can point out quite a
852 number, but in this combination switch you have an entirely different condition than you have where you use two separate switches as shown in the Freeman patent.

In the Freeman patent, where you have two separate switches, each one with its own thermostatic element, by merely reversing the position of the tubes you can get a make or break circuit. But in this switch, where you have the two-circuit tubes or contact devices operated from a single thermostat, you must interpose some kind of a differential mechanism, so that you can operate one tube independently of the other and that is exactly what this M 80 switch does. That is a different structure mechanically from a mere combination of two single switches.

Q. Then that structure that you have in your hand, the M-80, is not a combination of the 23 and 24 instruments shown in the Freeman patent, is it?

A. It is so far as its circuits are concerned, so far as the mechanical embodiment of a switch mechanism which might be composed of an infinite variety of structural devices to do that, so long as they would perform the sequence that Freeman teaches.

Q. Well now, if you take the M 51 and the M 53 and made that casing just large enough to cover them both, then you would have the same sequence of operation of
853 these two controls as you would by putting the 23 and 24 within one case?

A. Yes, if you connected them up as shown in the Freeman patent you would naturally get the same sequence of controls. The fact you put the two mechanisms in one casing would not change the operation in any way.

Q. You stated that this M-80 was not the same as putting these two switches within one casing, didn't you?

A. No, I did not say that. You can take these two physical structures consisting of these single switch devices here, and I can conceive where you can put those with their separate thermostatic elements in a single case and you have got switch 23 and 24 of the Freeman patent combined in one physical structure, but when you try to oper-

ate that combination of switches from a single thermostatic element, then you must change the operating mechanism that controls the contact mechanism, so that either of the contact mechanisms can operate independently of the other. That is an entirely different structure, which will perform an entirely different set of functions, than merely combining the two what I might call prior art switches.

854 Q. Then that M-80 is not the same as the combination of 23 and 24?

A. Well, when you say the same, Mr. Moore, do you mean the same in operation or the same in construction?

Q. Now, you said it was an entirely different switch than in the combination of the M-51 and the M-53.

A. Yes.

Q. And you said the M-51 and the M-53 corresponded to 23 and 24 of the Freeman patent. Now we are being charged with infringing this patent, or contributing to it, by selling this instrument, and I want to know whereby you get the basis for that charge, as long as you said it is not the same instrument as combining the two.

A. I said that the mechanism in the M-80 was of a type that would permit the independent operation of the two circuit switches, that is, 23 and 24, independently of each other. That is what the prior art instruments will do. But the reason they will do it is that each one has its own thermostatic spiral and they are not interconnected mechanically in any way. Now, when we come to the M-80 we have that mechanical interconnection and, therefore, you do in one switch what the Freeman patent shows is done in two switches. Now, from the standpoint of the circuit—

855 The Court: You mean you do in one instrument?

The Witness: Yes, your Honor, you do with one instrument what Freeman shows as being done with two.

Now, the circuits are identical. There is no change in the electrical circuits, but the mechanism by means of which you operate those circuits is different, obviously, because you operate in the M-80 both mercury tubes with a single thermostatic spiral, whereas in the prior art devices you have a mercury tube operated by its own individual spiral. Consequently one can go on and the other one can go off independent of each other.

In the M-80 they are both dependent for physical operation on a single spiral, and you must have in that M-80 job something that will permit each tube to operate independ-

ently of the other tube and at the same time be operated by the spiral.

Mr. Moore: Q. You are familiar with all the claims, are you not, of the Freeman patent?

A. I am generally familiar with them.

Q. Can you point out in any one claim where this instrument which is accused to infringe the patent, or contribute to the infringement of the patent, is specified?

A. I do not think any of those claims specify any 856 apparatus, Mr. Moore. They relate to a system, a furnace control system. I could carry out an infringement of those claims with any one of a large number of arrangements of those switches and instrumentalities.

Q. Then this M-50 in combination with an M-51 with the tube reversed, if they were hooked up in this particular circuit, would those claims be readable upon that combination?

A. I think so.

Q. Mr. Van Deventer, if you took the M-51 and the M-53 and set them at the limits or temperatures at which they would operate to be desirable, one as a limit control and the other as a fan control, and then took the two settings on the M-80 and on the switch controlling the fan, the switch controlling the limit, and put on the same settings, you would have the same results, would you not?

A. Hooked up in the Freeman system?

Q. Yes.

A. Yes.

Q. Now, Mr. Van Deventer, very often in laying out wiring diagrams to clearly explain the various circuits you take a few liberties and do not make them identical with that shown in a patent, is that not correct?

A. That is—

Q. I mean, in other words, this: Minneapolis 857 Honeywell Exhibit 13 shows the general hook up, the same as in Figure 2 of the Freeman patent, but you do not show the same passage of wires, or it is not an exact identical reproduction of that, is it?

A. I think I pointed out in my direct testimony that there is a difference in here, and that difference is this: Referring to Figure 2 of the Freeman patent, there are two wires shown Nos. 28 and 29 which come together on a binding post on the thermostat. That would be the point on Exhibit 13 to which I am now pointing, and on which I will make a mark and write "Binding Post." Now

what I have done in the Exhibit 13 is to join these two wires over here to the right. If I joined them on the binding post, we would have an identically same circuit condition as we would have in the thermostat, the so-called cold contact here forming part of the main or common circuit to which I directed your Honor's attention yesterday. Now going down to Figure 2 of the Freeman patent again there is a wire 32 which is joined to the left hand side of the switch and it goes down to the fan motor 22, and on that same binding post there is another wire 33 that runs over to the stoker motor 36.

Now in the Exhibit No. 13, instead of carrying these wires 32 and 33 back to the switch contact, which I
858 am now marking with lead pencil "Switch Contact," I have connected them together and spaced them apart so that they would be clearly shown here. If I had taken wire 32 in the diagram M H 13 and connected it with the switch contact on 26, which I have marked in lead pencil, the circuit arrangement would be exactly the same; we would still have the common circuit within the switch that we discussed yesterday, as we have the common or main circuit wire 27 in the diagram Exhibit 13, and in the Figure 2 of the Freeman patent, where that wire 27 is shown extended from the right hand bottom binding post of the switch to the left hand binding post of the thermostat 18.

Q. Now, that circuit as you described it is the circuit, and with the various controls in it,—that is defined by the claims of the Freeman patent, is it not?

A. That is part of it. It depends on whether the fan motor is in operation or the combustion motor is in operation.

Q. But you must have a hook up of your instruments in accordance with the disclosure in Figure 2 or the disclosure in your M H Exhibit 13, is that not correct?

A. That is correct.

Q. Can you explain, for instance, in referring to
859 Mercoid Exhibit BB, where the blue circuit indicates the fan circuit and where the red circuit indicates the motor circuit, and which is a reproduction of Figure 2 of the Freeman patent? You see here both the red circuit and the blue circuit are hooked in on one side of the room thermostat. Now, if the man in installing this thing had become confused and made a mistake and hooked this blue circuit on the other side of the room thermostat, what would happen? In other words, if, as Mr. Black explained

to the court the other day, you might hook this blue circuit over to some part on the other side of the room thermostat. In other words, if you covered up on the Patent Office drawing—

The Court: Now, if you are trying to make this intelligible for me, do you concede, Mr. Moore, that the Minneapolis-Honeywell Exhibit 13,—where is Minneapolis-Honeywell Exhibit 13; will somebody point it out to me?

Mr. Moore: That is it right here.

Mr. Freeman: It is what is called the sequence drawing.

The Court: Is it conceded that the wiring layout shown in Minneapolis-Honeywell Exhibit 13 is the same as the wiring layout disclosed in Figures 1 and 2 disclosed in the Freeman patent in suit?

860 Mr. Moore: Yes; I am not questioning that at all.

The Court: All right, then, for my convenience won't you please use 13? Then I can see it.

Mr. Moore: Yes.

Q. Now, I am asking, Mr. Van Deventer, if the man who hooked this up, connected this wire 28 over here to wire 27 on the other side of the room thermostat, in other words, on the enlarged drawing here, if this blue line was merely connected on the other side of the room thermostat, what would the result be?

A. First I would like to take this Exhibit 13 and put the actual change on it here.

The Court: Mr. Moore wants to know what would happen instead of taking 28 up there to where it goes you can take it over to 27. That is what you want to know, is it not, Mr. Moore?

The Witness: You would have—

The Court: Is that what you want to know?

Mr. Moore: Yes, sir.

The Witness: A. You would have the fan switch and motor directly across the line circuit. You would have the limit switch, the combustion motor, and the room thermostat in series across that same line. You would have what is covered by claim 1 of the Freeman patent.

861 Mr. Moore: Q. And you would have the same circuit, would you not, as Mr. Black referred to in Minneapolis Exhibit QQQ shown on the left hand side?

A. That is right.

Q. And you say that claim 1 would read on that circuit?

A. That is right.

Q. Will any other of the Freeman patent claims read on that circuit?

A. Yes, probably 6.

Q. Will claims 2, 3 and 4?

A. I will have to look at those. They have not been discussed here.

Mr. Freeman: You know, Mr. Moore, we are charging infringement only of claims 1, 4, 6 and 9.

Mr. Moore: I asked in the declaratory decree to have the court pass upon the validity of the patent.

The Witness: A. The arrangement we are now discussing, that is to say, the modifications shown on the left hand side of Mercoid Exhibit QQQ, claims 1, 2, 3 and 5 could be read on that. 6 and 7—

Q. How about 8?

A. Claim 8; I would like to study claim 8 a little bit before I make a definite answer to that. I do not think
862 claim 8 can be read on that, Mr. Moore.

Q. Then you get the same sequence of operation as defined in the claims which we have heretofore referred to as group 1 of the Freeman patent, namely, 1, 2, 3, 6, 7 and 8, is that right?

A. Yes.

Q. Those claims do not include a room thermostat, do they, as one of the elements?

A. Well, you take a claim like 1, for example; in claim 1 I find it recites:

"In a furnace control, the combination"

of certain apparatus. Now, I think you could have many other things in that system besides what is recited in the claim.

Q. In an automatic furnace control you would have to have a room thermostat, would you not?

A. I should think so.

Q. You would have to infer that that is part of the system when you refer to the limit control and the fan control?

A. I think so.

Q. The same as it could be said to be inferred in these letters of 1926 and 1927 and 1928 to the Mercoid Corporation when they did not mention specifically a room
863 thermostat, but it was a heating system for an oil burner. You have to read in between the lines, do you not?

A. I think you have got to have a thermostat.

Q. Now, if you hooked up 32 here on this Freeman pat

ect operation sequence drawing—rather, if you hooked up 28, that is the hot wire coming into the fan switch, to the other side of the return line, say 33, which is shown in the drawing as 31,—that is your oil burner, isn't it?

Mr. Freeman: Would you start over, Mr. Moore?

Mr. Moore: I am going to. I am getting myself confused, as well as everybody else.

Q. This is the hot wire.

Mr. Freeman: Let us give it a number.

Mr. Moore: Q. 28, as shown on the Freeman patent, coming in here. Now, if that wire were carried over to 31, what sequence of operation would you get?

A. Well, you would have both the fan motor and the combustion motor controlled by the limit switch and the room thermostat in series.

Q. And would that change your sequence of operation of the heating system?

A. Oh, yes. Yes, that would change it, because your fan could never operate with the limit switch open.

864 Q. Have you ever had any experience with heating systems that have limit switches in them?

A. Oh, yes.

Q. How many times and how often during the heating season does the furnace become overheated so that the limit switch operates?

A. I could not say that, because it depends on so many conditions that I would have to make a number of assumptions.

Q. Do you have a heating system of that kind in your home?

A. I do not think that that is the important thing. I think the important question is that when the emergency arises the limit switch goes open by reason of the fact that the furnace is going to burn up, then it is quite important that you have the safety feature.

Q. Then it is only a safety feature, this limit switch, in case you have an accident, or something out of the ordinary occurs, as you say, to save the house from burning up?

A. That is right; that is all they use the limit switch for.

Q. With that hook up that I suggested here, 28 to 31, that would be the same, would it not,—or compare that
865 description with the hook up shown on the right hand side of Mercoid Exhibit QQQ?

A. That is correct.

Q. During normal running of the furnace, without any accidents occurring, what would be the sequence of operation in accordance with the Freeman patent with this hook-up as shown on the right hand side of Mercoid Exhibit QQQ?

A. Well, the difference is that in the Freeman patent the fan switch 23 operates independently of the limit switch 24, whereas in the sequence shown by the arrangement on the right hand side of Exhibit QQQ, the operation of the fan switch 23 is dependent on the limit switch. We could go all through the positions from 1 to 7 and I could then point out in detail, but that, broadly, is the distinction, that in one, that is to say in Freeman, you have operation independently of the limit switch, and in the other circuit that we are discussing, the fan switch 23 is connected in series, so to speak, with the thermostat 18 and the limit switch 24.

Q. Now I asked you if this hazardous condition did not occur to cause your opening of 24, what would be the normal sequence of operation of the fan and the burner motor and the thermostat?

866 A. The normal operation would be that as long as the limit switch 24 remains in closed circuit position, that the room thermostat would go on and off, and when it was on the burner motor 35 would operate and the fan 22 would operate and the fan switch 23 would control the fan within the limits of temperature for which it is set.. When the thermostat went off everything would go off.

Q. Can you read claim 2 of the Freeman patent upon this connection, or hook-up, as shown on the right hand side of Mercoid Exhibit QQQ?

A. I haven't tried to do it yet.

Q. Will you endeavor to do so?

A. No, that claim cannot be read on the right hand side of Exhibit QQQ.

Q. Will you please apply it and show why not?

A. The claim includes: "Apparatus for controlling the rate of combustion," which we have in the burner motor 35, and apparatus controlling the "rate of supply of a heat conducting medium"; that would be the fan 22. "Thermostatic apparatus responsive to furnace temperature;" that would be the limit switch 24 and the fan switch 23. "And connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to accelerate combustion and checks

867 the supply of said medium when furnace temperature

is below a predetermined degree." Now, with this set-up here, when the furnace temperature is below a certain degree, the limit switch 24 is on and the fan here is then controlled entirely by the thermostat, and if you are talking now about reading this claim 2 on here without including the thermostat, you cannot so read it. You have got to include the thermostat in that claim as part of the thermostatic apparatus responsive to furnace temperature.

868 Q. Well, now—

A. It is,—if you will let me conclude I think I will get the explanation on the record.

Q. Yes.

A. The thermostatic apparatus, the room thermostat, is responsive to furnace temperature, but I do not think that is what the claim means. I think that what the claim is talking about is the limit switch 24 and the fan switch 23, and if we place that interpretation on the claim, I do not think it can be read on this circuit.

Q. Now, there is only one question. You said that this 23 was controlled entirely by the room thermostat.

A. Under the conditions of the limit switch being closed, as specified in the claim, when the furnace temperature is below a predetermined degree.

Q. And when the furnace temperature is below the predetermined degree of the setting of the furnace switch, then that would be open, would it not?

A. You mean the fan switch?

Q. The fan switch.

A. Yes, it would be open.

Q. And it would not close until the temperature had gotten up to the proper degree to force air through the rooms?

A. That is correct.

869 Q. Now, will you apply, if you can, or distinguish claim 5 from the hook up on the right hand side of Mercoid Exhibit QQQ?

A. We have the same elements in the claim, but it includes another element where it says, "Other thermostatic apparatus responsive to the temperature of the object to be heated." That is the room thermostat 18. Then the claim recites that there are "connections between the control apparatus," which is the fan switch 23 and the limit switch 24," and said last mentioned thermostatic apparatus," which is the room thermostat 18, "by means of which said control apparatus operates to check both combustion and the supply of said medium," which is the air,

"when said object is above a predetermined temperature irrespective of the furnace temperature."

Q. What does it mean by "object"; that is the room, is it?

A. That is the room.

Q. Yes.

A. I think that would operate probably in that manner. The control apparatus would operate to check the combustion and supply of the medium when the object is above the predetermined temperature, but that would be dependent upon the condition of the room thermostat.

870 Q. What does the claim specify,—anything?

A. Yes. "When the room is above the predetermined temperature, irrespective of the furnace temperature." Now, that is going to check both the combustion and the supply, and you can make such an arrangement. I do not find it on this figure here.

The Court: Take a short recess, gentlemen.

(A short recess was here had, after which the proceedings were resumed as follows:)

Mr. Freeman: Mr. Moore, I think I can save some of your time and perhaps save some of the court's time. As I have said, we rely on claims 1, 4, 6 and 9, which cover the real contribution of Freeman, or that point of novelty wherein on rise of temperature the limit switch opens and permits the fan to continue to run.

Claims 2, 5, 7 and 10 we are willing to concede are possibly readable upon a 1929 catalog of the Mercoid Corporation. There is some question just when a 1929 catalog is published, as to whether it is early in 1929 or late in 1929. Obviously, Freeman has been able to carry his date back with respect to what was involved in the interference with Jones to sometime in 1929. We do not expect the court to accept a date that somebody else proved and somebody else passed on in the Patent Office.

871 Rather than bringing Freeman in here and putting up a battle with respect to claims 2, 5, 7 and 10, I might say the record shows there was some large volume or transcript of testimony in connection with the interference proceedings that would involve considerable expense, and as far as we are concerned, we have always said the point of novelty of Freeman, or the thing that Freeman did, was never done by anyone else, and was that thing wherein the limit switch, when it moved to open circuit position, would

permit the fan to run. Claims 2, 5, and 7 are not directed to that, your Honor, and if it would make Mr. Moore feel happier with respect to the declaratory judgment suit independent of the case, we are willing to concede that those claims are invalid, or whatever the court wants to do, at least, in so far as The Mercoid Corporation are concerned, and they can have whatever they want with respect to those claims, 2, 5, 7 and 10.

Now, that leaves two claims in the patent that we do not urge, but those two claims are directed to include, among other things, the novelty that I have spoken of, and we are not conceding anything as to those claims. That might save some time. That will leave claims 3 and 8 in suit so far as their declaratory judgment suit is concerned, 872 but we are not relying on them in connection with the infringement suit. That should save considerable time on the part of the court and on the part of counsel.

Mr. Moore: May it please your Honor, I have just one more question to ask Mr. Van Deventer while he is on the stand.

Q. I believe you testified to the circuit arrangement shown in Minneapolis-Honeywell Exhibit 4-F and Minneapolis-Honeywell Exhibit 2-F. You are familiar with the circuits shown on those two exhibits?

A. Yes. These are out of the two sets of sequence drawings.

Q. Yes.

A. Yes, I am familiar with those.

Q. One was a reproduction of a wiring diagram from some Mercoid publication, and the other was a reproduction of another or different wiring diagram from another Mercoid publication, was it not?

A. That is what I understand.

Q. And the Minneapolis-Honeywell Exhibit 4-F discloses a Mercoid furnace fan control as a separate instrument and a Mercoid limit control type M-51 as a separate instrument?

A. I understand that to be the fact, yes.

Q. And the Minneapolis-Honeywell Exhibit 2-F 873 shows the fan and limit control both in the same casing?

A. That is correct.

Q. Now, there is a sequence here, or a position of the two, and in Minneapolis-Honeywell 2-F the positions, I understand, are those when the furnace is warm and the room is warm, and the room thermostat is off, the limit switch

is closed, the fan switch is closed, the burner is off and the fan is on, is that correct?

A. That is right.

Q. And do you find the same sequence or position of the instruments in Minneapolis-Honeywell Exhibit 4-F?

A. I do.

Q. Have you compared the exact wiring of these two exhibits with the wiring on the Freeman patent?

A. These are sequence drawings showing the operation of the various parts. The wiring here is somewhat different, not so far as the circuits are concerned, but so far as the physical layout of the wiring is concerned.

Q. Now, in the Freeman patent, when the room thermostat opens it shuts down everything, does it not?

A. That is right.

Q. Does it when the room thermostat opens in these two wiring diagrams; does that shut down everything?

A. No.

874 Q. It lets the fan run, doesn't it, until the limit control opens?

A. That is right.

Q. Which one does not shut down everything when the room thermostat opens?

A. Exhibit 4-F.

Q. Then, in Exhibit 4-F when the room thermostat opens it does not shut down the fan and burner both, as it does in the Freeman patent, is that correct?

A. That is right.

Q. Isn't that true in both of these exhibits 4-F and 2-F, when the room thermostat opens, the fan is not shut down?

A. That is right.

Mr. Moore: Cross-examination closed.

Redirect Examination by Mr. Freeman.

Q. You were asked with respect to M-H Exhibit 2-F and M-H Exhibit 4-F, particularly with respect to the room thermostat. I now ask you if in each of those two installations, following the hook-up of 2-F and 4-F, if the limit switch, mind you, the limit switch and not the thermostat, moves to open circuit position while the fan continued to run?

875 A. No. Ask me the question again. I am confused between the limit switch and thermostat.

Q. If the limit switch in 2-F and 4-F moves to open cir-

cuit position, upon temperature rise, the fan switch will remain closed, is that correct?

A. That is right.

Q. And the fan will continue to run?

A. That is true.

Q. So that in both 2-F and 4-F position 6 as there referred to in the exhibits, you will get fan operation upon temperature rise after the rate of combustion has been checked or the burner has been turned off as a result of the limit switch?

A. May I see 4-F, please?

(Witness refers to Exhibit 4-F.)

Yes, in 4-F when the limit switch is closed the fan will be on.

Q. And when the limit switch is in open circuit position on temperature rise the fan will likewise be on?

A. That is right.

Q. Is that likewise true of Exhibit 2-F?

A. Yes.

Q. Exhibits 2-F and 4-F are the same in so far as the fan continuing to run upon temperature rise after the
876 limit switch has shut down the burner, is that correct, Mr. VanDeventer?

A. That is right. That is position 6 in both these sequences of drawings.

Mr. Freeman: That is all.

Mr. Moore: No recross.

(Witness excused.)

Mr. Freeman: Mr. Martin, will you take the witness stand?

HAROLD MARTIN called as a witness on behalf of the defendant, having been first duly sworn, testified as follows:

Direct Examination by Mr. Freeman.

Q. Your name is Harold Martin?

A. That is correct.

Q. Where do you live, Mr. Martin?

A. Minneapolis, Minnesota.

Q. By whom are you at present employed?

A. Minneapolis-Honeywell.

Q. Will you give us the full name?

A. Minneapolis-Honeywell Regulator Company.

Q. How long have you been employed by Minne-
877 apolis-Honeywell Regulator Company?

A. Since 1930.

Q. And prior to that time by whom were you employed?

A. Time-O-Stat Controls.

Q. And the full name as Time-O-Stat Controls Company?

A. That is correct.

Q. Where was Time-O-Stat Controls Company's place of business when you worked for that company?

A. Elkhart, Indiana.

Q. And prior to your working for Time-O-Stat Controls Company, by whom were you employed?

A. Absolute Con-Tac-Tor, Elkhart, Indiana.

Q. How did you happen to go from Absolute Con-Tac-Tor Corporation to Time-O-Stat Controls Company?

A. Through a merger of Time-O-Stat and Absolute Con-Tac-Tor.

Q. These two companies merged, Time-O-Stat and Absolute Con-Tac-Tor?

A. That is right.

Q. Do you know about when that merger took place?

A. Late in 1928.

Q. You spoke about a merger of Absolute Con-Tac-Tor with Time-O-Stat. Do you know the full name of the Time-O-Stat Company which merged with Absolute Con-Tac-Tor?

878 A. I think it was Time-O-Stat Controls, Milwaukee, Wisconsin.

Q. Do you recall whether or not instead of the word "Company" they used the word "Corporation," Time-O-Stat Controls Corporation?

A. I don't recall whether it was "Corporation" or "Company."

Q. Time-O-Stat Controls Company of Elkhart, Indiana, then came into existence after the merger, which you say was late in 1928?

A. That is right.

Q. Going back now to a control known as No. 56, will you tell us which company made that control, that is, Absolute or Time-O-Stat, prior to the merger?

A. Prior to the merger of Time-O-Stat and Absolute?

Q. Yes.

A. Absolute Con-Tac-Tor made the control.

Q. When you worked at Absolute Con-Tac-Tor Corporation of Elkhart, Indiana, what were your duties?

A. Inspector.

Q. And will you tell us quickly just what an inspector does?

A. An inspector calibrates and tests and inspects the controls.

879 Q. When you say "calibrate," does that mean setting the control so that it will work properly with respect to temperatures or pressure?

A. With respect to scale setting, yes.

Q. And do you employ a scale upon the instrument?

A. Yes.

Q. And after you make an inspection of an instrument, what do you do with the instrument?

A. Well, we stamp them and deliver them to the packing department.

Q. And when you say you "stamp them," will you tell me a little more in detail just what you do when stamping the instrument?

A. We stamp the date and the inspector's initials.

Q. And was that a practice generally followed in connection with the controls by the Absolute Con-Tac-Tor Corporation?

A. Yes.

Q. And was that continued when it merged with Time-O-Stat Controls Company?

A. Yes.

Q. Now, you say you stamped them with the date and the inspector's initials. Will you tell me just what you used to indicate the date?

880 A. We used the alphabet to date the month of the year. For instance, "A" represents January, "B", February, and then the year was the number "30" if it was the year 1930 or "31" if it was the year 1931, and then the inspector's initials followed that, and in my case it would be "HM".

Q. So that if you inspected an instrument, let us take a No. 56 Time-O-Stat control, in February of 1930, what marking would appear upon the instrument?

A. It would be "B-30-HM."

Q. And if the instrument were inspected by you in March of 1930, what would be the marking upon the instrument?

A. It would be "C-30-HM."

Q. How high up in the alphabet do you go with your letter markings?

A. I think we went to the letter "M". We eliminated the letter "I" because it was confusing with the figure "1".

Q. So the letter "M" meant what month?

A. December.

Q. And that was a practice that you followed in Absolute Con-Tac-Tor and continued with Time-O-Stat Controls Company?

881 A. That is right.

Q. These No. 56 instruments made by Absolute Con-Tac-Tor Corporation, what kind of a name plate or cover plate did you employ on the instrument?

A. We used a glass, a round glass cover, that was etched "Absolute Con-Tac-Tor."

Q. Did you continue to use the same glass cover with any etchings on after Time-O-Stat Controls Company was organized?

A. No.

Q. You were out to Wheaton, Illinois, this morning and had an opportunity to look over the three Time-O-Stat controls which have already been referred to as aquastat switches or aquastats, and I will ask you now if you had an opportunity to check the inspection markings on those instruments, and what did you find?

A. I found two of them were manufactured in February, 1930, and one was manufactured in March of 1930.

Q. Now, why did you say two of those instruments were made in February, 1930, and one made in March of 1930?

A. Two were marked "B-30" and one "C-30."

Q. And what were the initials that you found in the three instruments?

A. "L.C."

882 Q. Do you by any chance recall the inspector's name whose initials are "L. C."?

A. No, I don't.

Q. Did you have occasion to measure the thickness of the name plate upon the instruments that you saw this morning at Wheaton, Illinois?

A. Yes.

Q. And what was the thickness?

A. .040.

Q. What kind of an instrument did you use to make such measurement?

A. A micrometer.

Q. And that is a standard instrument used for measuring thicknesses of material, is it not?

A. Yes, sir.

Q. Do you happen to have a name plate that corresponds to the name plates upon the instruments that you saw this morning at Wheaton, Illinois?

A. Yes; this is the name plate I saw in Wheaton, Illinois.

Q. Did you personally make a comparison as to the lettering on the name plate with the name plate that you now have in your hand?

A. Yes, sir.

883 Q. And how did they compare?

A. Identically.

Q. Does that go with respect to all three of the instruments that you saw this morning?

A. Yes.

Q. And have you had occasion to apply a micrometer upon the name plate that you have in your hand, which we will mark for identification M-H EXHIBIT NO. 25?

(The instrument was so marked.)

A. Yes.

Q. And how do they compare?

A. They all are .040 of an inch.

Q. Had Time-O-Stat Controls Company, in connection with its No. 56 instrument used any front name plate of any other kind of control to the one that you now have in your hand marked M-H Exhibit No. 25?

A. I don't think so.

Q. Prior to the name plate that you have here it was a glass cover, was it not?

A. Yes.

Q. You were asked prior to your coming to Chicago to look through the files of Minneapolis Honeywell with respect to name plate drawings of the Time-O-Stat Controls Company. Did you do so?

884 A. Yes.

Q. And what was the earliest name plate drawing that you found with respect to the No. 56 instrument? What is the date of that drawing?

A. 3 2 27 was the earliest date.

Q. That is the superseded drawing, which I also have here. What is the date of this particular drawing?

A. 3 11 29.

Q. And the name plate drawing No. "N-350" which you have in your hand, refers to an earlier drawing No. N-223, does it not?

A. Yes.

Q. And the date of that superseded or earlier drawing is 9 2 27, is that correct?

A. Yes.

Q. I note upon the drawing the word "list" and under the word "list" the No. 56. What does that mean?

A. That is the instrument number.

Q. And I also notice the words, or rather the letters, "REQ." with the figure "1" thereunder; what does that mean?

A. It means one required for each instrument.

Q. Would you compare the drawing N-350 with the name plate M-H Exhibit 25?

885 A. Exhibit 25 was made from drawing N-350, which I have in my hand.

Q. And did you, in going through the files of Minneapolis-Honeywell, pick up drawing No. N-223, which is referred to in drawing N-350?

A. Yes.

Q. And what do you find is that date on drawing N-223?

A. 9 2 27.

Q. And what do you find with respect to a change in the name plate from Absolute Con-Tac-Tor Corporation to Time-O-Stat Controls Company?

A. In 3 13 29 it was changed from Absolute Con-Tac-Tor Corporation to Time-O-Stat Controls Company.

Q. And where do you find any notation that a change had been made from Absolute-Con-Tac-Tor Corporation to Time-O-Stat Controls Company?

A. In the upper left hand corner of this drawing there is a notation "No. 3 3 13 29 was Absolute Con-Tac-Tor."

Q. And is it customary to note changes in drawings on the drawings themselves from time to time?

A. Yes, sir.

Q. And can you, by looking at the original tracing, determine whether or not there has been an erasure on the tracing where there now appears the words "Time-O-
886 Stat Controls Company"?

A. Yes.

Q. The name plate, drawing N-223, includes calibrations, does it not, or markings?

A. Yes, sir.

Q. On the instruments that you saw today at Wheaton, Illinois, did you find a complete name plate, or did you merely find calibrations on the side of the instrument?

A. Calibrations only.

Q. And do you have here any such plate illustrating only the calibrations?

A. Yes, this plate.

Mr. Freeman: The plate just referred to by the witness is marked for identification M-H EXHIBIT NO. 28.

(The plate was so marked.)

Mr. Freeman: Q. And how does the name plate, M-H Exhibit No. 28, or rather, the calibration plate, compare so far as size and appearance and general make-up with the instruments that you examined this morning?

A. Identically.

Q. Do you know whether or not the name plates for the side of the instrument corresponding to drawing N-223 with the words "Time-O-Stat" thereon were ever used?

A. Yes.

887 Q. They were used?

A. Yes.

Q. And the earliest drawing that you have with respect to such name plate is March 13, 1929, is that correct, Mr. Martin?

A. Yes.

Q. So that we have the sequence of name plates with respect to the No. 56 instrument I ask you whether you produced drawing N-350, dated 3/3/31, which is referred to in connection with the earlier No. N-350 drawing, and did you bring such drawing with you?

A. Yes.

Q. And you made a search of the drawing files with respect to the name plates of Minneapolis-Honeywell yesterday or the day before, is that correct?

A. Yesterday.

Mr. Freeman: So that the record is clear, we offer the name plate as M-H EXHIBIT NO. 25; as M-H EXHIBIT 26 drawing No. N-350, dated March 11, 1929; as M-H EXHIBIT NO. 27 the calibration plate of one of the No. 56 instruments corresponding to the Time-O-Stat controls at the Portner installation; as M-H EXHIBIT 28 a drawing illustrating a name plate, drawing No. N-223, indi-

cating a change from Absolute Con-Tac Tor Corpora-

889 tion to Time-O-Stat Controls Company under date of

March 13, 1929; and as M-H EXHIBIT 29 name plate drawing No. N-350, dated 3 3 31.

I ask that we be permitted to use as exhibits the prints made from the original tracings, which original tracings are here in court for inspection and use in connection with your cross-examination, Mr. Moore.

The Court: Very well.

899 Mr. Moore: I have no cross-examination of this witness.

(Witness excused.)

Mr. Freeman: Mr. Read, will you please take the stand?

ORIAN J. READ, called as a witness on behalf of the defendant, being first duly sworn, testified as follows:

891 *Direct Examination by Mr. Freeman.*

Q. Will you please state your full name?
A. Orian J. Read.
Q. And where do you live, Mr. Read?
A. Milwaukee, Wisconsin.
Q. And by whom are you employed at the present time?
A. Perfex Corporation.
Q. Of Milwaukee, Wisconsin?
A. Of Milwaukee, Wisconsin.
Q. Where were you employed in the year 1930?
A. Time-O-Stat Corporation, Elkhart, Indiana.
Q. And when did you enter the employ of Time-O-Stat?
A. In July of 1929.
Q. That was really Time-O-Stat Controls Company, was it not?
A. At that time I believe it was.
Q. It was the Time-O-Stat outfit at Elkhart, Indiana, is that correct?
A. That is right.
Q. And how long did you continue with that company at Elkhart, Indiana?
A. Until March, 1932.

Q. So you were with Time-O-Stat at Elkhart from
892 July 1, 1929, until March of 1932?

A. That is correct.
Q. And what was your occupation or what work did you do with the company, Mr. Read?
A. I was an inspector.

Q. And in what department or departments, if you can tell us?

A. At that time the department was known as the calibration department.

Q. And what kind of instruments did you inspect or calibrate?

A. Should that be more specific? That is, all of our controls were automatic controls at that time.

Q. And they all required inspection?

A. They all required inspection, that is right.

Q. Are you familiar with a control known as type No. 56?

A. Yes, sir.

Q. Did you have occasion to see such a control or controls today?

A. I did.

Q. And that was at Wheaton, Illinois?

A. Yes, sir.

Q. And how many controls did you see of the No. 56 type today?

893 A. There were three.

Q. Do you recall the name of the establishment?

A. I believe the name was Portner. I am not positive, but I believe it was

Q. You were introduced to Mr. Portner this morning?

A. I was.

Q. Did you have occasion to carefully examine those controls?

A. I did.

Q. And were they of the kind made by Time-O-Stat Controls Company at about the time you entered its employ in the summer of 1929?

A. They were.

Q. Were they of the type of controls that you personally inspected?

A. Yes, sir.

Q. I am not talking about your personal inspection of those three controls?

A. No.

Q. But of the general type.

A. Of the general type, that is right.

Q. You worked on the No. 56 controls?

A. Yes, sir.

Q. Now tell us just what you did when a control

894 came off of the assembly line, about inspecting it; what did you do?

A. Well, we adjusted it to operate at a given temperature, that is, in respect to the setting of the scale.

Q. Did these instruments have a calibration scale on them?

A. They did.

Q. And where was the calibration scale located.

A. On the outside of the case, you might say.

Q. Not on the front?

A. Not on the front.

Q. Or not on the rear?

A. Not on the rear.

Q. When an instrument was calibrated and inspected by yourself what did you do then with that instrument to indicate that you had given it an o.k.?

A. We placed an inspector's stamp within the case.

Q. What did the inspector's stamp consist of in your case? Taking, for example, if you inspected a No. 56 control, what would you do with it?

A. We would stamp it according to the date on which it was inspected. That would bear the month and also the year and the initials of the man who did the work.

Q. So that by way of example, if you inspected a 895 control in January of 1932, a No. 56 control, what notations or code markings would you put on the control itself?

A. It would be A-32 O.R.

Q. A-32 O.R.?

A. That is right.

Q. And that would mean January, 1932?

A. That is right.

Q. Orian Read?

A. That is right.

Q. And if a control were inspected by you in February of 1930, what marking would appear upon such control?

A. B-30 O.R.

Q. And if the inspector who inspected a control in February of 1930, say, was Harold Martin, what would the inspector's notation be, or the code marking?

A. B-30 H.M.

Q. You inspected these three controls this morning at Mr. Portner's place of business, and do you recall which control you looked at first?

A. The one that was easiest or most accessible the way I would look at it. It would be on the side of the boiler.

Q. And what notation did you find on that control?

A. C-30 L.O.

Q. Was that L.O. or L.C.?

A. I beg your pardon. L.C.

896 Q. What does C stand for?

A. March, the third month.

Q. And the 30?

A. The year 1930.

Q. And the initials would indicate the name of the inspector?

A. The inspector, yes.

Q. Do you recall anybody in the Time-O-Stat Controls Company employed in 1930 whose name might bear the initials L. C.?

A. There was a party there for a short time by the name of Lester Cole. I would not know whether he calibrated that control or not.

Q. Was it a standard practice with all inspectors to use the initial corresponding to a month, that is, A for January and B for February?

A. Yes, sir, that was the practice throughout the department with every control.

Q. In other words, all of the controls made by the company had that same code marking?

A. That is, if they had the inspection department's o.k. on the control.

Q. That is, if a control passed through the inspection department it then had a month code marking, the year marking, which would be the last two numbers of the

897 year, with the initials of the inspector?

A. Yes, sir.

Q. And was that the practice of Time-O-Stat Controls Company when you entered its employ of July of 1929?

A. It was.

Q. And was that the practice of the company so long as you were its employee, until March of 1932?

A. It was.

Q. How high up in the alphabet did you go?

A. I believe the letter M was the last letter.

Q. And that meant December?

Q. Now, you looked at a couple of other controls this morning at the Portner establishment. Do you recall which

of the controls you looked at next? I am talking now about—

A. The sequence?

Q. Yes.

A. Over the door was the next control we looked at.

Q. What did you find on that with respect to its code marking?

A. C-30 L.C.

Q. And that means that the control was made in what year?

898 A. March, 1930.

Q. Was it a practice of your company, that is, when you were with Time-O-Stat Controls, to mark upon the controls the particular letters corresponding to the particular month that was then in existence?

A. Yes, sir.

Q. And who had charge of changing the stamping mechanism that you used by which you coded the controls that you inspected?

A. The foreman or the supervisor.

Q. And when was it that you changed from one letter of the alphabet to the next letter of the alphabet?

A. On the first of the month.

Q. And you know that of your own personal knowledge to be the practice of the company at the time that you were in its employ?

A. Yes, sir.

Q. And I take it then you looked at the third or last Time-O-Stat control in the Portner installation which was the one that has been referred to as hardest to get at?

A. Hardest to get at, that is right.

Q. And what did you find on it by way of a code mark?

A. B-30 L. C.

899 Q. And what would that indicate to you?

A. February, 1930.

Q. Did you compare the name plates upon the three instruments that you saw this morning with the name plate which we have here as M-H Exhibit 25?

A. I did.

Q. And what did you find by way of marking and configuration of the letters? How did they compare?

A. As far as I could see, they were the same.

Q. Did you take occasion to use a micrometer to measure the thickness of some of the name plates on the Time-O-Stat controls at the Portner installation this morning?

A. I did.

Q. How many did you "mic"?

A. Two.

Q. Why did you "mic" only two and not the third one?

A. I cannot answer that question.

Q. Is it not a fact that back of the name plate there is some glass?

A. Yes, there is.

Q. And when the name plate leaves the plant in its complete form, that is, as part of the instrument, is it not true that the name plates are fastened by a cement material to the glass?

900 A. Yes, sir.

Q. Two of them were loose this morning?

A. I believe that is correct.

Q. And when you "micked" the two name plates that you had an opportunity to inspect this morning, what did you find as to their thickness?

A. They measured forty thousandths.

Q. Did you "mic" the name plate that we have here, M-H Exhibit 25?

A. Yes, I did.

Q. And how did the two name plates at the Portner installation compare as to thickness with the thickness of the name plate that we have here, M-H Exhibit 25?

A. They were the same.

Mr. Freeman: I did not ask Mr. Martin with respect to the drawing, but I do want to call attention at this time to name plate drawing No. N-350, dated 3.11.29, wherein mention is made of changes, and as the first change there appears the following: "4-29-29, thickness was .042."

Q. I might ask you now what is meant by the .042 thickness.

A. .042?

Q. Yes.

901 A. Forty-two thousandths.

Q. You can read drawings, can you not?

A. Yes, sir.

Q. What is meant under "Purchase material spec." by the words "sheet alum"?

A. Sheet aluminum.

Q. And as to thickness, what do you find is the number now, referring to the thickness of the name plate?

A. .040, which would be forty thousandths.

Mr. Freeman: Cross-examine.

Mr. Moore: No cross-examination, and had I known that this witness was to corroborate the witness before him, I would not have asked permission to check on the numbers.

Mr. Freeman: We can put another one on two, if you want to.

Mr. Moore: No, I have no objection at all. As long as Mr. Martin's testimony is corroborated by the witness who is on the stand, I have no desire to hold up the case.

Mr. Freeman: All right, that is all, thank you, Mr. Read.

(Witness excused.)

902 JOHN L. HARRIS, called as a witness on behalf of the defendant, being first duly sworn, testified as follows:

Direct Examination by Mr. Freeman.

Q. Will you please state your full name?

A. John L. Harris.

Q. Where do you live, Mr. Harris?

A. White Fish Bay, Wisconsin.

Q. That is a suburb of Milwaukee, is it not?

A. Yes.

904 Q. By profession you are a lawyer?

A. Yes, sir.

Q. And by whom are you employed?

A. Perfex Corporation, of Milwaukee, Wisconsin.

Q. And that is the same company that Mr. Read is now employed by?

A. Yes, sir.

Q. Do you know whether or not your company took a license from Minneapolis-Honeywell Regulato: Company under the Freeman patent No. 1,813,732?

A. Yes, it did.

Q. Have you had occasion to look through your company records recently with respect to the granting of a license by Minneapolis-Honeywell to your company?

A. Yes, I have.

Q. Will you tell us the date of the license?

A. April 18, 1939.

Q. And what is the date of the letter forming a part of and attached to the agreement? I am referring to the top letter?

A. That is the same date, April 18, 1939.

Q. What is the receiving stamp date appearing on the Minneapolis-Honeywell letter indicating when it came into the possession of your company, Perfex Corporation?

905 A. April 19, 1939.

Q. May I ask you whether or not the stamp in the upper right hand corner is the patent department stamp?

A. That is right.

Q. Of the Perfex Corporation?

A. That is the patent department stamp.

Q. And this agreement then was turned over to your department when it came to Perfex?

A. That is the procedure.

Mr. Freeman: We offer a photostatic copy of the letter of April 18, 1939, to Perfex Corporation, as M-H EXHIBIT 30.

(The exhibit was so marked.)

Mr. Freeman: Q. The letter was taken from the files of the Perfex Corporation by yourself?

A. Yes, it was.

Q. And the letter as well as the agreement has been in your custody or your department at the Perfex Corporation?

A. Yes, it has been in the patent department files.

Q. Then I understand your company substituted for the typewritten license agreement a printed one, is that correct?

A. That is correct.

906 Q. And do you have the printed agreement here?

A. Yes.

Q. Will you give us its date?

A. This is the printed agreement and it is dated August 20, 1940.

Q. And did you then get with the printed agreement a letter corresponding to the letter forming a part of the original agreement dated April 18, 1939?

A. Yes.

Q. Did it have 25 per cent or did it have 25 cents?

A. I did not see the letter myself, but I understand from Mr. Tate that it did have 25 per cent.

Q. And do you have any of your company's records with respect to the error and your company having called it to the attention of Minneapolis-Honeywell?

A. Yes, I have here a copy of a letter dated September 5, 1940.

Q. And where did you get the carbon copy of the letter of September 5, 1940?

A. I removed it from the patent department files.

907 Mr. Freeman: For convenience, I would like to read the letter at this time, so that the court may have full information. The letter is dated September 5, 1940, addressed to Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota.

(Reading letter.)

The letter indicates that it was written by V. R. Tate.

Q. By the way, do you know where Mr. Tate happens to be today?

A. He is in the East.

Q. In what connection?

A. In connection with some defense work being done by Perfex Corporation.

Q. And did Minneapolis-Honeywell then send you a substitute or corrected letter?

A. Yes, they did.

Q. And when did your company receive the corrected letter?

A. On September 9, 1940.

Q. That happens to be a receiving stamp of the Perfex Corporation?

A. Yes, sir.

Q. And when did the corrected letter referring to 908 the typographical error reach your department, the patent department?

A. On the same date, September 9, 1940.

Q. Do you have upon the letter the receiving stamp or date stamp of the patent department of the Perfex Corporation?

A. Yes.

Q. And where did you get the letter of September 6, 1940?

A. I removed it from the patent department files of the Perfex Corporation.

Mr. Freeman: I would like to read the letter of September 6, 1940, to your Honor.

(Reading letter.)

Q. Do you now find as forming a part of your agreement the corrected letter which is attached to the printed agreement dated August 20th?

A. Yes.

Q. And what is the amount therein specified? Is it in percentage or is it in cents?

A. This says twenty-five cents.

Mr. Freeman: We offer in evidence photostatic copy of the letter of September 5, 1940, from Perfex to Minneapolis-Honeywell, calling attention to the error, and a photostat of the letter of September 6, 1940, from Minneap-
909 olis-Honeywell to Perfex substituting or correcting the error in the letter, and a copy of the corrected letter dated August 20, 1940, to correspond to the date of the original or printed agreement received by Perfex, in accordance with its receiving stamp on September 9, 1940, collectively, as M-H EXHIBIT 31.

(The exhibit was so marked.)

Mr. Freeman: Q. All of these letters came from your corporate files?

A. Yes.

Q. And filed and kept in accordance with the standard custom of the Perfex Corporation?

A. Yes.

Mr. Freeman: You may cross-examine.

Mr. Moore: No cross-examination.

(Witness excused.)

910 Mr. Moore: May it please your Honor, I was asked to find the earliest records we had of the printing of that bulletin in 1931. This invoice with a diagram, which is a zinc proof of the diagram in that Bulletin A-14, has been produced, and it is dated 7 24 31, which shows apparently that Mr. Owens was correct in stating that that was two thousand August, 1931. I do not want to create any impression that we are trying to put the date back of what it really was.

Now, if you care to have this introduced in evidence, Mr. Freeman, I will be glad to put it in.

Mr. Freeman: No, so long as you are telling us that that date is August, 1931, which happens to be subsequent to the issuance of the Freeman patent, there is not any question at all.

I am frank to tell you, Mr. Moore, when you introduced that particular drawing, after I hounded Mr. McCabe for early literature and so forth, I was then surprised that there was not anything else put in to carry the date back, because obviously there is some little work done a day or two in advance of bulletins. But the record now stands that that was published in August of 1931 in a quantity of

two thousand, and that Mr. Black apparently was in
911 error.

Mr. Moore: Mr. Black, Mr. Moore and Mr. Courteol and everybody out there was in error.

The Court: Anything further from either side?

Mr. Moore: No rebuttal, your Honor.

The Court: Both sides rest?

Mr. Moore: Both sides rest.

The Court: The exhibits which have been offered by any party during the course of the trial and which have not been specifically ruled upon, may be received.

Mr. Freeman: Just so that our record is straight, I understood that that Detroit Lubricator bulletin, which was a price list of some competitor, was kept out by your Honor.

The Court: I ruled on that. If I did not rule on it, that is out.

Mr. Moore: That is out.

The Court: It was not brought in.

Mr. Freeman: That is out?

Mr. Moore: Yes. That was K and K-1.

Mr. Freeman: All right.

The Court: Now, the next case, I think, is a jury trial. I would like you to argue this case as soon as that case is over.

912 Now, I have a one-track mind, and the way I will always think about this case, regardless of the order of your arguments is this:

I will want to know what the party who says that the patent is infringed says about the infringement of each specific claim. I will want to know what he thinks infringes each specific claim. And in that connection, I might say I am not an electrical engineer, I am not an engineer of any kind. I did at one time study a little physics and I did at one time study a little chemistry and things of that sort, but very little. I can figure out what an electric circuit is sometimes. But to that end I wish you would simplify this matter as much as you can in the time at hand.

Now, what is this exhibit here?

Mr. Freeman: M-H 13.

The Court: That simplifies the claims of the patent very much to me.

If you contend some wiring diagram put out by the Mercoid Corporation infringes that particular patent or some claim in that patent, if you can so arrange that wiring diagram which you say infringes, so that I can compare

it with that, without doing violence, of course, to the diagram which is claimed, it will simplify matters for me very much.

913

In that connection, I take it anything of that kind that you want to show to me ought to be gotten to your opponent as soon after this hearing as possible.

Mr. Freeman: That is right.

The Court: So that he can see or he can make up his mind whether or not it truthfully represents the diagram which it is said to represent.

Then the next thing I will think about is the question of validity, and I shall want the party who says that the patent is invalid to take up and discuss those patents or those prior patents or prior issues or publications that he thinks anticipate, and I should like him, without doing violence to those patents or to those prior issues or to those prior publications, to arrange those in the form of that exhibit—

Mr. Freeman: M-H 13.

The Court: (Continuing) —as near as may be, so that I can see the differences, if any, or the similarities, if any.

Then the next thing I shall consider in my mind, when I come to consider, is the question or the further consideration of this question of validity; and I shall want to hear what the owner of this patent says about this question of validity in reply to what his opponent has said about invalidty.

914

Then the next thing I shall want to hear about is this question of—

Mr. Freeman: Contributory infringement?

The Court: Yes, contributory infringement. I would like to have some discussion on that.

Mr. Moore: And expanding the scope of the patent?

The Court: What do you mean by expanding the scope of the patent?

Mr. Moore: As a system patent, expanding it to cover an article.

The Court: Well, whatever you mean by that, you can discuss it somewhere along the way. But I understood you said there was some violation of the Anti-trust law.

Mr. Moore: That was brought in with the license agreements, your Honor, and the terms of the license agreements.

The Court: When you make your argument in that connection, bear in mind that you have to take me by the hand

and lead me through the labyrinth, so I can understand what your contention is in that respect.

Mr. Moore: I think at the close it would be best to present to your Honor, after going through what is in-
915 fringed, what infringes the validity of the patent.

The Court: In that connection I see a very interesting question as to unclean hands. Unclean hands can, of course, be the basis of a defense to claims which are alleged to be infringed, but whether unclean hands can be the basis of an action for a declaratory judgment in respect of claims which are not alleged to be infringed is a nice question. That may come up at some time later.

I do not know that I have covered all the issues, but that, generally speaking, is the way that my mind will sooner or later have to take this matter up, and I desire each of you to argue as to those matters from the standpoint of your respective clients. I am not inviting you to waste any time. I want you to take all of the time that is necessary to present the matter fully, so that I may understand it.

Mr. Moore: I feel that Mr. Freeman and I can cooperate and set up our arguments on both sides along the lines that the court has just outlined.

The Court: That is not any hard and fast rule. I am just telling you how my mind will eventually work with the thing regardless of how you present it. I know you will present it well. Possibly you will present it better than
916 I could anticipate, and therefore wish for it, but eventually my mind will come around to thinking in that order.

917 And on, to wit, the 14th day of May A. D. 1942 there was filed in the Clerk's office of said Court a certain BLOOMINGTON DEPOSITION MERCOID EXHIBIT A in words and figures following, to wit:

By Mr. Moore:

Q. 1. Will you please state your name?
A. 1. R. V. Hopkins.
Q. 2. Age?
A. 2. 47 years.
Q. 3. Residence?
A. 3. 405 Florence Street, Bloomington, Illinois.
Q. 4. Your occupation?

A. 4. Comptroller and Secretary of the Williams Oil-O-Matic Heating Corporation, Bloomington, Illinois.

Q. 5. How long have you been connected with the Williams Oil-O-Matic Heating Corporation?

A. 5. Since March 1, 1926.

Q. 6. What was the business of the Corporation when you first joined them?

919 A. 6. They were in the business of manufacturing oil burning equipment, and were vendors or sellers of electrical controls in addition to their own product.

Q. 7. I show you a number of large books here on the table. Do you know what they are?

A. 7. Yes, I do.

Q. 8. What are they?

A. 8. They are copies of invoices—customers' invoices—which were filed away as a permanent record to support our entries on the customer accounts.

Q. 9. Who had these books bound, do you know?

A. 9. Those books were kept under my direction.

Q. 10. And can you detach any of the records from the binders?

A. 10. It is a practically impossible to detach or remove a sheet without completely tearing the sheet literally from the book.

Q. 11. Have you tried to remove one of them?

A. 11. Yes, I have.

Q. 12. When?

A. 12. On various occasions, and again a few days ago. They are bound with what we call a split nail, driven from each side with a hammer, and the harder they are driven the tighter they become, so it is rather an interlocking device.

920 Q. 20. I will ask you if you can find in these records any invoice relating to the Evangelical Church?

A. 20. Yes.

Q. 21. In what volume?

A. 21. January, 1926 to September, 1927 inclusive, 98 11057.

Q. 22. You are now referring to a page which bears 921 at the upper right-hand corner the number "10669 P", are you not?

A. 22. Yes, sir.

Q. 23. And that has a marking across the front of the page "Invoice Duplicate". What does that indicate?

A. 23. This is a copy of the invoice rendered for filing and classification of sales.

Q. 24. What is listed on this invoice?

A. 24. 1 Federal Mercoid Thermostat.
1 Federal Mercoid Furnace Control.
1 Special Federal Mercoid Control.
1 Allen-Bradley Relay Switch 110, 60 cycle, 3 H.P.

Q. 25. Does this invoice duplicate bear any date?

A. 25. Yes, 2/2/26.

Q. 26. Where does that date appear?

A. 26. At the left side of the page, near the binding margin.

Q. 27. I how you a photostat here and ask you if you know what that is?

A. 27. This is a photostat of invoice No. 10669-P.

Q. 28. Does it show the date near the left-hand edge?

A. 28. No, sir.

Q. 29. As the photostat was taken from the bound book it was impossible to show the date, and I therefore ask you to indicate in ink, above the title, "Evangelical Freidens Church", the date you find on the original invoice, close to the edge.

922 By Mr. Moore: Let the record show that the witness has placed the date "2 2 26" upon the photostat.

By Mr. Moore: The photostat just identified by the witness and marked with the date "2 2 26" is offered in evidence in lieu of page No. 10669-P in the bound volume, as MERCOID EXHIBIT C-2.

(Said photostat was accordingly marked Mercoid Exhibit C-2, and was made a part of this deposition.)

By Mr. Moore:

Q. 30. Do you find any other references in these books relating to the Evangelical Church?

A. 30. Yes, sir.

Q. 31. In what volume?

A. 31. Plant Invoices, January to April, 1930, inclusive, Nos. 30400-32099.

Q. 32. What is the page that you are referring to as showing a notation in regard to the Evangelical Church?

A. 32. Copy of invoice used for posting to the customer's account, as well as used for filing and preserving the identification of the charge to the customer's account.

Q. 33. What is the number that appears on the upper right-hand corner, below the series of x's?

A. 33. 31068.

923 Q. 34. Is this invoice dated?
A. 34. Yes, 2/22/30.
Q. 35. And where does that date appear?
A. 35. In the upper left-hand corner of the invoice.
Q. 36. And what is the charge on this invoice?
A. 36. The charge is for replacing Mercoid furnace control for furnace fan.
Q. 37. Is this the original copy?
A. 37. This was made at the time the original was prepared. The original in all cases is sent to the customer. That is the general practice of most businesses today.
By Mr. Moore: The photostat of the page identified by the number "31968" just referred to by the witness, is offered in evidence in lieu of the original page, as MERCOID EXHIBIT C-3.
(Said photostat of said page was accordingly marked Mercoid Exhibit C-3, and was made a part of this deposition.)
By Mr. Moore:
Q. 38. Do you find in these bound volumes of invoices any invoice to Ned Dolan?
A. 38. Yes, sir.
Q. 39. What volume is that in?
A. 39. May to September, 1926 inclusive, numbering 6900 to 8199 inclusive.
924 Q. 40. I note that the page you refer to bears the number at the upper right-hand corner "7395", which has been scratched out and the number "6658" placed above it. What is this page that you referred to?
A. 40. This page is an invoice showing the merchandise purchased by the customer. It is also used for posting to the customer's account. It is also used for binding and in further support of entries made upon the customer's account.
Q. 41. And what is the name and address of this customer?
A. 41. Ned E. Dolan, Mercer Avenue, Bloomington, Illinois.
Q. 42. Does any date appear upon this order?
A. 42. Yes, sir.
Q. 43. Where is it?
A. 43. The date is July 27, 1926. It appears near the upper left-hand corner of the invoice, near the binding edge.
Q. 44. I show you a photostat here and ask you if you know what that is?

A. 44. Yes, sir.

Q. 45. What is it?

A. 45. A photostatic copy of the invoice No. 6658 showing the charge to Ned E. Dolan's account for merchandise purchased.

Q. 46. The photostat was taken from a page in the 925 bound volume and therefore does not show the date along the left-hand edge that you have just referred to. Will you please take your pen and mark above the notation, "Ned E. Dolan", the date that you testified appeared on the left-hand edge?

By Mr. Moore: Let the record show that the witness has placed the date 7 27 26 on the page.

By Mr. Moore: The photostat of invoice No. 6658 upon which the witness just placed the date 7 27 26 is offered in evidence as MERCOID EXHIBIT D-1 in lieu of the original invoice in the book.

(The photostat of invoice No. 6658 was accordingly marked Mercoid Exhibit D-1, and was made a part of this deposition.)

By Mr. Moore:

Q. 47. I believe you said that you had looked through these books about a week ago?

A. 47. Yes.

Q. 48. And now since that time, or more recently, have you looked for any further invoices in these books relating to either of these two?

A. 48. No, sir.

926 Q. 49. Now I show you here in "Plant Invoices", April to October, 1927, an invoice and ask you if you know what that is?

A. 49. Customer's invoice No. 10847 for merchandise sold to Ned Dolan, 301 N. Mercer Avenue, Bloomington, Illinois?

Q. 50. And what date appears upon that invoice?

A. 50. 4 11 27.

By Mr. Moore: The photostat of this invoice No. 10847, dated 4 11 27, to Ned Dolan, is offered in evidence as MERCOID EXHIBIT D-2 in lieu of the original page in the book.

(The photostat of invoice No. 10847 was accordingly marked Mercoid Exhibit D-2, and was made a part of this deposition.)

By Mr. Moore:

Q. 51. I show you another book here and ask you if know what that is?

A. 51. This is a machine ledger sheet used as a customer's account, written and posted with a bookkeeping machine.

Q. 52. Do you find any notation in this book relating to Ned E. Dolan?

A. 52. Yes, sir.

Q. 53. What do you find?

A. 53. A ledger sheet marked "Ned E. Dolan, Mer-
927 cer Ave., City", with entries on it as follows:

June 1, 1926—$50.00 cash credit

Another entry, July 27, 1926, Invoice No. 7692, showing a charge of $766.00 and a balance of $716.00

Q. 54. The year appears under the notation "date" and over the "June 1" and "July 27", does it not?

A. 54. Yes, sir.

By Mr. Moore: A photostat of this ledger sheet, "Ned E. Dolan, Mercer Ave., City", about which the witness has just testified, is offered in evidence as MERCOID EXHIBIT D-3 in lieu of the original sheet.

(The photostat of ledger sheet "Ned E. Dolan, Mercer Ave., City" was accordingly marked Mercoid Exhibit D-3, and was made a part of this deposition.)

By Mr. Moore:

Q. 55. Do you find in this volume you have just testified about any notation in regard to the Evangelical Church?

A. 55. Yes, sir.

Q. 56. Will you state what you found?

A. 56. A ledger sheet under the name of "Evangelical Friedens Church—Fred Heise, Treas." At the top of the date column "1925" and directly beneath this date 928 is "May 25", and the item is a deposit of $50.00 cash.

The next item, "July 18, 1925, Oil-O-Matic, $475.00"

The next item, "Nov. 30, cash credit $425.00"

Next item under the date column "1926" is "Feb. 3, invoice No. 5941, charge of $35.00"

Next item under the date column is "Mar. 22—C M772 $35.00"

Next item, "July 7, 1925, charge $35.00"

By Mr. Moore: A photostat of this ledger sheet about which the witness has just testified is offered in evidence as MERCOID EXHIBIT D-4.

(The photostat of ledger sheet of Evangelical Friedens Church—Fred Heise, Treas., was accordingly marked Mer-

coid Exhibit D-4, and was made a part of this deposition.)

By Mr. Moore: The original books referred to by the witness are available to the Minneapolis-Honeywell for inspection whenever they desire.

By Mr. Moore: Direct examination closed.

By Mr. Freeman: Cross-examination.

X-Q. 57. Mr. Hopkins, will you turn to the ledger sheet for the Evangelical Church, Mercoid Exhibit D-4: Do
929 you find on that ledger sheet any items corresponding to the invoice, Mercoid Exhibit C-2, and if so will you point them out?

A. 57. I do not find any items in the invoice that correspond with the ledger sheet.

X-Q. 58. And the ledger sheet goes back as far as July 7, 1926, correct?

A. 58. Yes.

X-Q. 59. And the invoice, Mercoid Exhibit C-2, as you have testified, is dated 2/2/26, correct?

A. 59. Yes, sir.

X-Q. 60. Do you happen to have any other ledger sheets for the Evangelical Church?

A. 60. I will answer the question in this way: Every invoice for a customer charge is posted to a ledger sheet. It was a practice in past years to have more than one ledger sheet. Some were used for parts, controls and accessories; other ledger sheets were used for the charge of oil burners or what was termed "Plant product". In later years, however, all charges were combined, and at the present time any charge of any nature is entered on one single sheet.

X-Q. 61. The $475.00 charge of July 18, 1925 inclusive controls as well as plant product, does it not, and I hand you Mercoid Exhibit C-1?

A. 61. Yes.

930 X-Q. 62. And would you say that as early as July, 1925 the items were combined; that is the "plant product" as you have referred to it, and controls?

A. 62. The answer to that question is this: Any controls or equipment used in the sale of an oil burner were combined in one invoice. That practice of combining accessories with the oil burner is still in practice. The practice of using different ledger sheets was used entirely for invoices containing controls and accessories alone. The price is usually established for the customer which will include

all the necessary controls and equipment to make a complete installation.

R-X 63. The $35.00 item under invoice No. 5941, how do you know what that covers, which appears upon the ledger sheet, Mercoid Exhibit D-4?

A. 63. Without referring to the invoice, I would not.

X-Q. 64. Well looking at the ledger sheet, it would not be the controls according to your explanation?

A. 64. I would say that a control is likely to sell for more than that.

X-Q. 65. Then as far as we are concerned, the ledger sheet, Mercoid Exhibit D-4, has nothing whatever to do with Mercoid Exhibit C-2?

A. 65. I would say not.

By Mr. Freeman: That is all.

931. And the said

HERSCHEL V. GIBSON called and examined at the instance of the complainant, having been sworn by the said Harriet N. Murdock, as Notary Public as aforesaid, first duly cautioned and sworn to tell the truth, the whole truth and nothing but the truth, in the matter of controversy aforesaid, was examined upon oral interrogatories, and he did thereupon depose, testify, and say as follows, viz.:

Examination at the Instance of the Complainant.

By Mr. Moore:

Q. 1. Please state your name, age, residence and occupation.

A. 1. Herschel V. Gibson; 53 years old; Bloomington, Illinois; mechanical engineer.

Q. 2. Who are you working for at the present time?

A. 2. Williams Oil-O-Matic Heating Corporation.

Q. 3. How long have you worked for the Williams Oil-O-Matic Heating Corporation?

A. 3. I came here in May, 1924.

Q. 4. And what were your duties when you first came to the Williams Oil-O-Matic Heating Corporation in May, 1924?

A. 4. Well, practically the first thing I did when I came here was to help Mr. Price in regard to diagrams.

932 Q. 5. Who is this Mr. Price you are referring to?
A. 5. He is our chief service manager.
Q. 6. You stated that you helped him in doing what?
A. 6. In making diagrams for dealers.
Q. 7. What are your duties at the present time?
A. 7. I do general drafting and take care of the patent situation.
Q. 8. Do you also assist Mr. Price in any manner?
A. 8. Yes, sir.
Q. 9. In what manner?
A. 9. For the same reason as I stated before; that when we have had any diagrams to make up for dealers it generally fell upon me to do it.
Q. 10. I show you a book here and entitled "Installation and Service Manual", and ask you if you know what that is?
A. 10. Yes, sir.
Q. 11. What is it in general terms?
A. 11. It is a book that was made up in the form of a service manual to include diagrams for the purpose of giving information to the Williams Oil-O-Matic dealers.
Q. 12. I call your attention to the Index Sheet No. 1 and ask you if you know anything about this sheet?
A. 12. Yes, sir.
Q. 13. What is it?
A. 13. It is a typewritten sheet that I had Mr. Na-
933 than Hirst make up for this book.
Q. 14. Who is Nathan Hirst?
A. 14. He is our stenographer in the Engineering Department.
Q. 15. I note there are some initials at the bottom of this sheet following the notation "Drawn by". Do you know whose initials they are?
A. 15. Yes, sir, they are mine.
Q. 16. And I notice on the opposite corner following the notation, "Date" Feb. 1, 1928". Do you know when that date was placed on there?
A. 16. That was typed in by Mr. Hirst when he made this sheet.
Q. 17. And when were your initials placed on there?
A. 17. After Mr. Hirst returned the sheet to me.
Q. 18. Now I call your attention to a notation on the Index Sheet No. 1—"A-67", and ask if you can find that page in the book?

A. 18. Yes, sir, here it is. (Witness pointing to page in book.)

Q. 19. Now I note that this page, A-67, appears to be a reprint of a drawing or tracings, within a border, very similar to page 1 of the Index Sheet. Following the word "Date" on the lower right-hand corner, appears the notation "Oct. 19-26", and on the opposite corner, following the notation "Drawn by", appear the initials, "H.V.G.", 934 and following the notation "Approved" the initials "O.H.P." Whose initials are those opposite "Drawn by"?

A. 19. They are my initials.

Q. 20. And they were placed there in your own handwriting?

A. 20. They are mine; they were placed there in my own handwriting.

Q. 21. And the initials "O.H.P." following the word "Approved"?

A. 21. They were placed there by Mr. O. H. Price after the drawing was completed by me and approved by Mr. Price.

Q. 22. Do you know in whose handwriting "Oct. 19-26" is?

A. 22. Yes, sir, that is my handwriting.

Q. 23. Do you know when that was placed on there?

A. 23. When I completed the drawing.

Q. 24. Can you state whether or not it is your custom to date drawings of this character when you initial them?

A. 24. Yes, sir, I always sign them and date them at the time the drawings are completed.

Q. 25. Now who drew this picture that appears upon this page?

A. 25. I did.

Q. 26. And this Mr. O. H. Price you referred to, who is he?

A. 26. He is the Service Manager for the Williams Oil-O-Matic Heating Corporation.

935 Q. 27. Is he the Mr. Price you referred to as assisting in making diagrams?

A. 27. Yes, sir.

Q. 28. Did you talk over this drawing with Mr. Price before you made it?

A. 28. Yes, sir.

Q. 29. And did you talk over the drawing with anybody else?

A. 29. Well, at times I talked with Louis Lartz.

Q. 30. And who is Louis Lartz?

A. 30. He is the Chief Electrician for the Williams Oil-O-Matic Heating Corporation.

Q. 31. Was he acting as Electrician for the Williams Oil-O-Matic Heating Corporation when you entered their employ?

A. 31. Yes, sir.

Q. 32. And is he now in their employ?

A. 32. Yes, sir.

Q. 33. And was this Mr. Price in the employ of the Williams Oil-O-Matic when you came with the company?

A. 33. Yes, sir.

Q. 34. And is he still in their employ?

A. 34. Yes, sir.

Q. 35. Can you state whether or not this drawing was made from a diagram or from an actual installation.

936 A. 35. This drawing—this particular drawing—the same as all the drawings in this Service Manual—were made from pencil sketches.

Q. 36. Now I call your attention to Index Sheet No. 2, which bears the initials "H.V.G." at the lower left-hand corner and the date "Feb. 1, 1928" on the lower right-hand corner, and ask you whose initials those are?

A. 36. They are my initials.

Q. 37. Do you know when the date, "Feb. 1, 1928," was placed on there?

A. 37. When it was finished.

Q. 38. What is the title across the top of this page?

A. 38. Dealers Installation and Service Manual.

Q. 39. I call your attention to a notation there under "A 150" and ask you if you can find that page in the book?

A. 39. Yes, sir, here it is. (Witness points to page in book.)

Q. 40. What is the notation across the top of this page?

A. 40. It is a title which reads as follows: "Diagram Showing the Installation of a Mercoid Furnace Control For Warm Air Furnaces."

Q. 41. I note in the lower left-hand corner following the notation "Drawn by," the initials "H.V.G." Do you know whose initials they are?

A. 41. Yes, sir, they are mine.

937 Q. 42. And across the bottom the date, "Dec. 24, '25," do you know in whose handwriting that date appears?

A. 42. That is also in my handwriting.

Q. 43. There is also a drawing on this page. Do you know who made that drawing?

A. 43. I made that drawing.

Q. 44. And do you know when you made that drawing?

A. 44. Yes, sir.

Q. 45. When?

A. 45. December 24, 1925.

Q. 46. And I note here below your initials, following the notation "Approved by," other initials. Whose initials are they?

A. 46. Mr. Price.

Q. 47. That is the Mr. Price you have referred to before?

A. 47. Yes, sir.

Q. 48. And when did you place this date, "Dec. 24, '25," on this drawing?

A. 48. After the drawing was completed.

Q. 49. Do you know when Mr. Price put his initials on there?

A. 49. He also placed his initials on the drawing after it was approved by him.

Q. 50. Who instructed you to make this drawing?

A. 50. Mr. Price.

Q. 51. And did you consult Mr. Price in regard to this drawing?

938 A. 51. Yes, sir.

Q. 52. And did you consult with anyone else, that you remember?

A. 52. Probably Mr. Lartz. I can go a little further if you wish me to.

Q. 53. All right, go ahead.

A. 53. In regard to making these drawings for the Service Manual, it was general practice that whenever a job came up for Mr. Price, Mr. Lartz and myself would get together and work up a pencil sketch and after it was approved by Mr. Price, I made a drawing for the Manual.

Q. 54. Was this drawing made from an actual installation or from a sketch?

A. 54. It was made from a pencil sketch.

Q. 55. And the representation of this article identified as "Furnace Control," was that made from a sketch or from an actual instrument?

A. 55. To the best of my recollection, it was either made from the control itself or from a cut in the catalog.

Q. 56. I show you photostat of a catalog of the Federal

Gauge Co. and ask you if you can find such a cut as you have referred to?

A. 56. Yes, sir.

Q. 57. Where.

A. 57. On the last page, Figure 50.

939 By Mr. Moore: Let the record show that the witness is referring to the publication of the Federal Gauge Co., entitled "Mercoid Bulletin E-1," dated March, 1925.

The original of this bulletin will be introduced at the trial. A photostatic copy is produced here and I will ask that it be marked for identification MERCOID EXHIBIT E-1.

By Mr. Moore: Photostats of the front page of the Installation and Service Manual, just referred to by the witness, Index Sheet No. 1, Index Sheet No. 2, Drawing A-67 and Drawing A-150 are offered in evidence as MERCOID EXHIBIT E-2, with the understanding that the original book will be produced.

By Mr. Moore:

Q. 58. I show you a photostat of another sheet of drawing, made apparently on a sheet of tracing paper similar to the drawings appearing in Mercoid Exhibit E, which is marked in the lower right hand corner as "Sheet No. A-198," and ask you what is the notation appearing at the top of this sheet?

A. 58. There is a notation which reads as follows:—"Fan type direct fired heating system showing wiring diagram with Oil-O-Matic Burner."

Q. 59. And I notice that at the bottom of this sheet 940 appear the initials "P.V.G." and the date "May 5-27."

Do you know whose initials they are?

A. 59. Yes, sir, they are mine.

Q. 60. And in whose handwriting is the date "May 5-27"?

A. 60. That is also my handwriting.

Q. 61. Do you know who made this drawing?

A. 61. Yes, sir, I did.

Q. 62. And when did you place your initials and date upon this drawing?

A. 62. After the drawing was completed.

Q. 63. And whose initials follow the notation "Approved by"?

A. 63. Mr. Price.

Q. 64. And that is the Mr. Price you have referred to?

A. 64. Yes, sir.

Q. 65. Did you consult anybody before you prepared this drawing?

A. 65. Yes, sir.

Q. 66. Who?

A. 66. Mr. Price and Mr. Lartz.

Q. 67. Was this diagram made from a wiring diagram or from an actual installation?

A. 67. It was made from a pencil sketch.

Q. 68. Do you know whether this sheet "A-198" appears in the Installation and Service Manual, Mercoid Exhibit E?

941 A. 68. No, sir, it does not.

Q. 69. Can you explain why it does not appear in that Manual?

A. 69. Yes, sir.

Q. 70. Why?

A. 70. When this book was made up it was the intention to include only standard diagrams.

Q. 71. Then am I to understand that this diagram, A-198, is not a standard diagram?

A. 71. That is right.

By Mr. Moore: I ask that this diagram, Sheet No. A-198, be marked for identification as MERCOID EXHIBIT F-2.

By Mr. Moore:

Q. 72. I show you another sheet marked "JA-258," which bears the notation: "Wiring diagram showing method of control when two or more burners are used in connection with unit heaters"; and this page at the bottom contains the initials "E.H.S." following "Drawn by," and the date "6-14-30," and I ask you if you know what this drawing is?

A. 72. I do not quite understand the question.

Q. 73. Do you know who made this drawing?

A. 73. Yes, sir.

Q. 74. Who?

A. 74. The initials "E.H.S." stand for Ed. H. Stempel.

942 Q. 75. And do you know who Ed Stempel is?

A. 75. Yes, sir, he was employed by the Engineering Department.

Q. 76. And is he still in the employ of the Engineering Department?

A. 76. No, sir.

Q. 77. Do you know where he is at the present time?

A. 77. No, sir.

943 By Mr. Moore:

Q. 1. Will you please state your name?

A. 1. Nathan E. Hirst.

Q. 2. Age?

A. 2. 35.

Q. 3. Residence?

A. 3. 1062 East Jackson Street, Bloomington, Illinois.

Q. 4. And your occupation?

A. 4. I am secretary to the Engineering Personnel.

Q. 5. Of what company?

A. 5. Of the Williams Oil-O-Matic Heating Corporation.

Q. 6. When did you first enter the employ of the Williams Oil-O-Matic Heating Corporation?

A. 6. In February, 1927.

Q. 7. What are your duties at the present time?

944 A. 7. I do all of the clerical and stenographic work and have custody of all the filing, with an assistant who takes care of it.

Q. 8. Do you have custody to the tracings from which wiring diagrams in the Installation and Service Manual, Mercoid Exhibit E-2, are prepared?

A. 8. I do.

Q. 9. Can you produce the original tracings of Sheet A-67?

A. 9. I can.

Q. 10. The original tracing of Sheet A-150?

A. 10. I can.

Q. 11. And Sheet A-198, corresponding to Mercoid Exhibit F-1, and the tracing of Sheet JA-258, corresponding to Mercoid Exhibit G-1?

A. 11. I can.

Q. 12. Those are the original tracings from which these photostats have been made and have been in your custody since the time they were made?

A. 12. Yes, sir.

Q. 13. And were these originals taken from the records of the company that were in your custody?

A. 13. They were.

Q. 14. Do you know who initialed Sheet No. JA 258?

A. 14. That was Edward Stempel.

Q. 15. Do you know where he is at the present time?

945 A. 15. No, I don't.

946 Q. 1. Will you state your name, age, residence and occupation?

A. 1. Orlo H. Price; 404 North Clinton Street, Bloomington, Illinois; age 57; National Service Manager of the Williams Oil-O-Matic Heating Corporation.

Q. 2. How long have you been National Service Manager for the Williams Oil-O Matic Heating Corporation?

A. 2. Since 1924.

Q. 3. Can you explain briefly what your duties are as National Service Manager?

A. 3. Working closely with the Sales Department in conjunction with problems that come up in connection with the installation of our product; making up various
947 wiring diagrams for the various control systems; handling of correspondence pertaining to installation and service of Oil-O-Matic heaters; making bricking plans for the building of fire boxes; all conversion jobs, and more or less work in conjunction with the Engineering Department in the development of oil burner products. I could elongate on this but I don't think it is necessary.

Q. 4. It will not be necessary. By the way, what is the business of the Williams Oil-O Matic Heating Corporation?

A. 4. Manufacturing of oil burner equipment, refrigeration equipment and air conditioning equipment.

Q. 5. What were the products of the Oil-O Matic Heating Corporation when you first entered their employ?

A. 5. Oil burners only.

Q. 6. Did they sell anything beside the oil burner itself?

A. 6. Controls, tanks, brick and high temperature cements and all equipment necessary to make a complete installation of the oil burner.

Q. 7. When you first came with the Williams Oil-O Matic, did they install these oil burners in Bloomington?

A. 7. Yes, sir.

Q. 8. And who was in charge of the installation?

A. 8. I was in charge of national and local installation service for a number of years following 1924.

948 Q. 38. I show you photostats of an Installation and Service Manual, marked Mercoid Exhibit E 2, and ask if you know what that is?

A. 38. This is what we called the Installation and Service Manual for the Williams Oil-O Matic Heating Corporation used in the early days.

Q. 39. Who got that up?
A. 39. I did.
Q. 40. Now I ask you to refer to Index Sheet No. 1:
A. 40. I have it.
Q. 41. Does that bear any date?
949 A. 41. February 1, 1928.
Q. 42. I also notice some initials at the bottom of that sheet. Do you know whose initials they are?
A. 42. H. V. Gibson, a draftsman employed by the Oil-O-Matic.
Q. 43. Do you know in what department?
A. 43. Engineering.
Q. 44. I call your attention to the notation on Index Sheet No. 1, "A 67," and ask you if you can find that page in the book?
A. 44. I have it.
Q. 45. I note this page is very similar to Index Sheet No. 1 and also bears the same initials, "H.V.G." following the notation "drawn by" and the date "Oct. 19, 1926," and also after the notation "Approved O.H.P." Do you know whose initials those are?
A. 45. That is my signature.
Q. 46. Did you place the initials on there yourself?
A. 46. I did.
Q. 47. Do you know when you placed them there?
A. 47. October 19, 1926.
Q. 48. How do you know that?
A. 48. For the reason that when the tracing was completed Mr. Gibson brought the tracing to me for final approval, and I then inserted my initials on the tracing, and he also put his initials thereon.
950 Q. 49. And what does the placing of your initials on there indicate?
A. 49. Final approval.
Q. 50. And what does the drawing show on this page, A 67?
A. 50. This shows a bricking plan for an American warm air furnace using an Allen-Bradley fan control and Mercury special hot air furnace control as a pilot or thermostat to operate the large industrial type fan blower, through a special relay.
Q. 51. Did you have anything to do with the making of this drawing?
A. 51. I did.
Q. 52. What?

A. 52. I made the pencil sketch; then referred the pencil sketch to Herschel Gibson.

Q. 53. Did you consult anyone besides Herschel Gibson in connection with this drawing?

A. 53. I did in this case. I remember having inserted the furnace and the fan on the tracing through Gibson; then after contacting our electrician, Louis Lartz, I worked out the wiring diagram on the control system which was added to the tracing at that time.

Q. 54. Who is this Louis Lartz that you spoke of?

A. 54. Louis Lartz is our electrician, in charge of all electrical work.

951 Q. 55. Was he in charge of all electrical work when you entered the employ of the Oil-O-Matic?

A. 55. He was.

Q. 56. And is he still employed by the Oil-O-Matic?

A. 56. Yes.

Q. 57. I believe you said something about an Allen-Bradley relay. Where is that shown on the drawing?

A. 57. In the upper right-hand corner and is referred to as "relay switch."

Q. 58. What is this "furnace control (special)" that is shown on the drawing?

A. 58. This is the standard Mercoid furnace control with Mercoid tube reversed, so as to close the circuit on furnace temperature rise. In other words, reverse acting.

Q. 59. Is that switch that you referred to or furnace control shown on this Mercoid bulletin, Mercoid Exhibit E-1?

A. 59. Yes, on page 4, Figure 50.

Q. 60. Is the part that you referred to as a trombone shown on this page, A-67?

A. 60. It is.

Q. 61. And where is it shown?

A. 61. On the top of the furnace, in the air chamber.

Q. 62. Is this furnace control special connected in any way to the fan or blower that is shown at the bottom of the nozzle through the relay?

952 A. 62. Yes.

Q. 63. And how does the furnace control operate the relay?

A. 63. When the contact is in the closed or "on" position, within the furnace control, the current flows through the furnace control circuit and the solenoid in the Allen

Bradley relay closing the relay with the current flowing directly from meter to the large motor on the floor.

Q. 64. Can you state the reason for using the Allen-Bradley relay in this particular hook-up?

A. 64. The relay was used for the reason of the large blower which necessitated a relay because of the motor load requiring 10 amperes, which is the maximum rating for the mercury tube.

Q. 65. What are the two lines above the relay switch with an arrow pointing to the right of the indicator?

A. 65. "To meter" as stated, meaning from source of power or to street.

Q. 66. Will you please describe briefly how the furnace control controls the operation of the blower?

A. 66. This special furnace control closes the circuit on temperature rise and actuates the relay, starting the fan blower. At the reduction of the furnace temperature the special furnace control opens the circuit and, through the relay, cuts off the operation of the fan.

Q. 67. What is the purpose of this fan?

953 A. 67. To boost the furnace or, in other words, to speed up the heat release from the furnace.

Q. 68. You spoke of the temperature within the furnace. The temperature within what part of the furnace?

A. 68. What we refer to as the furnace as a rule is the stove construction, inside of which is the fire and refractory brick.

Q. 69. What type of furnace is illustrated on this sheet No. A-67?

A. 69. Cast iron.

Q. 70. Is it steam?

A. 70. Warm air.

Q. 71. And where is the trombone of the control placed in the furnace?

A. 71. In the hood or bonnet and is exposed to the heated air.

Q. 72. And where does the heated air from this hood or jacket go to?

A. 72. To the room to be heated.

Q. 73. And then when the fan is operated, what happens?

A. 73. Cold air is drawn into the furnace.

Q. 74. And where does the cold air go?

A. 74. After it is heated it is forced into the room of a building.

Q. 75. And when does the fan begin to operate?

954 A. 75. When the furnace temperature is high enough to close the furnace control circuit.

Q. 76. And what temperature is that, do you know?

A. 76. It depends upon what is desired; it will range from 100 to as high as 200 degrees.

Q. 77. And that is the temperature of the air that is forced into the room, is it?

A. 77. At that particular time when the control closes the circuit.

Q. 78. And do I understand you to say that the fan will then operate as long as the temperature in the hood or bonnet is about the degree degree desired?

A. 78. It will continue to operate until the temperature setting of the control is reached on the low side, at which time the control will cut off the fan operation.

Q. 79. Do they have another name for this type of fan in connection with a heating furnace of this type?

A. 79. It is often referred to as a blower system.

Q. 80. Have you ever heard it called a booster fan?

A. 80. Yes.

Q. 81. I ask you to refer to drawing A-150 in the book that you have before you. I note that this drawing is entitled across the top, "Diagram showing the installation of a Mercoid furnace control for warm air furnaces," and at the bottom the initials "H.V.G." opposite the nota-

955 tion "Drawn by," and below those initials, after the notation "Approved by," "O.H.P."; also the date on the other side "Dec. 24, '25," and ask you if you know anything about this drawing?

A. 81. This is one of our standard wiring diagrams.

Q. 82. And who was it made by, if you know?

A. 82. I made the pencil sketch and then referred the subject to Gibson for tracing on tracing cloth after checking the wiring and control system over with Louis Lartz, our electrician.

Q. 83. What does the drawing represent beside the notation "Room Thermostat"?

A. 83. This room thermostat, referred to as the Mercoid, is manufactured by the Federal Gauge Co. and known as Figure 21.

Q. 84. What is the square marked "Control Box on Burner"?

A. 84. That was the control system manufactured by

Mercoid as used on our burners at that time and known as the Model "G" burner.

Q. 85. Is the room thermostat connected to this control box on burner?

A. 85. It is.

Q. 86. And what is the function of the room thermostat?

A. 86. To control the operation of the Oil-O-Matic burner in the warm air furnace.

956 Q. 87. What is the instrument indicated by the arrow on the line leading from the notation "Furnace Control"?

Q. 87. This is the Mercoid warm air furnace limit control, known as Figure 50.

Q. 88. What is the type of furnace indicated in this drawing?

A. 88. Warm air.

Q. 89. And do you find the trombone that you referred to on the Mercoid furnace control on that drawing?

A. 89. I do, shown in detail.

Q. 90. Where?

A. 90. At the upper right-hand corner of the furnace, with the furnace control proper mounted on the wall.

Q. 91. And didn't you state that this was a standard Mercoid furnace control, Figure 50?

A. 91. It is.

Q. 92. This shows the mercury tube switch in it, does it not?

A. 92. Yes.

Q. 93. And how is this mercury switch connected with the control box on the burner?

A. 93. It is wired in series with the room thermostat to the control box of the burner.

Q. 94. And what is the function of this furnace control?

A. 94. To shut off the oil burner when the furnace reaches a predetermined temperature, and to auto-
957 matically start it again provided the room thermostat is still calling for heat.

Q. 95. And is this one of the limit controls that you have heretofore referred to?

A. 95. Yes.

Q. 96. And what is this notation on the drawing, "Stack Safety"?

A. 96. That is a switch, single pole, the switch having a helix or coil.

Q. 97. And what is the purpose of the stack switch?

A. 97. It is used as a shunt switch and functions in conjunction with the safety device in the control box on burner.

Q. 98. I believe you said that this was a standard hook-up?

A. 98. Yes, it is.

Q. 99. Do you know whether any Oil-O-Matic has been installed in Bloomington employing this standard hook-up?

A. 99. A great number of installations were made of this hook-up in Bloomington. I recall one.

Q. 100. Do you know by actual experience whether or not a furnace control with the switch reversed to control the blower, such as shown on page A 67, has ever been installed in Bloomington?

A. 100. Yes.

Q. 101. Have you recently made any investigation to locate these two hook-ups?

958 A. 101. Yes.

Q. 102. Can you indicate the name and location of any building in Bloomington employing these two hook-ups?

A. 102. I can.

Q. 103. Where did you find it?

A. 103. The Evangelical Church, located on the corner of Front and Lee Streets.

Q. 104. Have you investigated these premises recently?

A. 104. Yes, I have.

Q. 105. Can you state when and who was with you?

A. 105. One week ago today.

Q. 106. Was that the first time?

A. 106. No, I was there previously with Mr. McCabe of Chicago.

Q. 107. And when was that?

A. 107. That was about a week previous to the time herein testified.

Q. 108. And when you visited this place a week ago today, who was with you, if anybody?

A. 108. Mr. Langdon Moore, Louis Lartz and the photographer.

Q. 109. What was done during this visit with the photographer?

A. 109. We found here a warm air heating system.

Q. 110. And what did the photographer do?

A. 110. He took pictures—photographs of various controls.

959 Q. 111. I show you a picture marked for identification Mercoid Exhibit A-1 and ask you if you know what that represents?

A. 111. This shows an Oil-O-Matic burner, Model "G" with Mercoid control box mounted on top of the fan housing.

Q. 112. Has that control box that you referred to any relation to Sheet No. A-150?

A. 112. Yes.

Q. 113. And where is that shown?

A. 113. Is is mounted over the fan housing of the burner?

Q. 114. In relation to anything else in the picture?

A. 114. It is mounted on the burner.

Q. 115. Well, what is that back of the burner?

A. 115. A lawn mower.

Q. 116. And who is the manufacturer of this furnace? Does that appear on the furnace?

A. 116. P. H. Magirl.

Q. 117. What type of furnace was this?

A. 117. Warm air.

Q. 118. I show you another photograph marked for identification Mercoid Exhibit A-2, and ask you if you know what that is?

A. 118. This is a photo taken in the fan room, through the door, directly to the left of the front of the furnace.

Q. 119. What does this picture show?

960 A. 119. This picture shows the fan motor, fan, and Allen-Bradley starter relay switch.

Q. 120. Where is the Allen-Bradley starter relay switch shown?

A. 120. It is the large box at the upper left in the picture.

Q. 121. Another of these pictures shows where the fan is hooked up. Can you tell where this fan housing shown around this fan leads to?

A. 121. The fan housing or blower is connected to the lower part of the warm air furnace.

Q. 122. And where does it go from the lower end of the warm air furnace? That is the air that comes out of the fan?

A. 122. Over the heating element of the furnace and on its way through the ducts to the rooms.

Q. 123. I show you another picture marked for identi-

fication Mercoid Exhibit A-3 and ask you if you know what that is?

A. 123. This is a photo taken from another position in the fan room.

Q. 124. I see a door in the center. Do you know where that door leads to?

A. 124. That door opens into the plenum chamber.

Q. 125. And what are those instruments mounted on the door?

A. 125. Mercoid controls.

961 Q. 126. What is the instrument mounted on the lower side of the door?

A. 126. That is a Mercoid furnace limit switch, referred to previously as the trombone type of control, and illustrated on the Mercoid bulletin, Mercoid Exhibit E-1, Figure 50, page 4.

Q. 127. There is a round casing shown that is not mounted on the door. Do you know what that is?

A. 127. That is a part of the control referred to containing the Mercoid tube switch.

Q. 128. What is it mounted on?

A. 128. It is mounted on a board and bracket.

Q. 129. What is the round casing on the door above the trombone?

A. 129. This is a later type of Mercoid control which functions in a similar manner actuated by a thermo coil exposed to the heat within the furnace.

Q. 130. I show you a copy of Mercoid catalog No. H-5, 1929, and call your attention to pages 24 and 25 thereof and ask you if you can tell me what is shown on page 24?

A. 130. This is the control relay referred to and known as Figure M-51.

Q. 131. What is shown on page 25?

A. 131. The Mercoid furnace control for warm air furnaces, Figure 50.

962 By Mr. Moore: Photostats of the title page of this Mercoid Catalog No. H-5, 1929, and pages 24, 25, 31 and 32, which correspond to the exhibit attached to Complainant's Answer to Interrogatory No. 11, is offered in evidence as MERCOID EXHIBIT G-2.

(Said photostats of the Mercoid catalog pages were accordingly marked Mercoid Exhibit G-2, and made a part of this deposition.)

By Mr. Moore:

Q. 132. Do you know what is the function of this Mer-

coid control, M-51, shown on the door in photograph, marked for identification Mercoid Exhibit A-3?

A. 132. In this case that control is used as a fan pilot control. It is, however, a standard warm air furnace control with tube reversed.

Q. 133. I show you another photograph marked for identification Mercoid Exhibit A-4, and ask you what that represents?

A. 133. This photo was taken in the same room, but with the furnace door open on which the controls are mounted.

Q. 134. That is the same picture as Mercoid Exhibit A-3 with the door open, is that right?

A. 134. Right.

Q. 135. What is this cylindrical thing that appears
963 to project from the upper side of the door in this picture marked for identification Mercoid Exhibit A-4?

A. 135. That is the coil or end of control, Figure M-51 Mercoid.

Q. 136. And what appears below that coil on the door?

A. 136. That is the trombone or tube.

Q. 137. No, I mean sticking out back of the door?

A. 137. That is the trombone or tube which is a part of the control referred to previously as Figure 50.

Q. 138. That is the end of the tube then?

A. 138. The end, yes.

By Mr. Moore: The four photographs marked for identification are now offered in evidence as MERCOID EXHIBITS A-1, A-2, A-3 and A-4.

(The said photographs were accordingly marked Mercoid Exhibits A-1, A-2, A-3 and A-4, and made a part of this deposition.)

By Mr. Moore:

Q. 139. After these pictures were taken, did you trace the circuits from these controls to the oil burner?

A. 139. We did.

Q. 140. Did you find any room thermostats anywhere?

A. 140. I found two room thermostats.

Q. 141. Where were they located?

964 A. 142. One was located in the Sunday School room adjoining the furnace room, on the same floor; another on the floor above near the Church pulpit.

Q. 143. Do you know who installed these controls?

A. 143. Louis Lartz installed these controls.

Q. 144. Did you inspect any other dwellings in Bloomington at that time?

A. 144. We did.

Q. 145. What dwelling did you inspect?

A. 145. That of Mr. Ned Dolan, Country Club Place, in Bloomington.

Q. 146. Who went with you on that trip?

A. 146. Mr. Langdon Moore, Louis Lartz and the photographer.

Q. 147. Did the photographer take any pictures while he was there?

A. 147. He took a picture of the front of the furnace and one of the controls in the smoke pipe of the furnace.

Q. 148. I will show you a photograph marked for identification Mercoid Exhibit B-1 and ask you if you recognize it?

A. 148. I do.

Q. 149. What is it?

A. 149. This is the heating system in the Ned Dolan residence.

Q. 150. What furnace is employed there?

A. 150. Warm air.

965 Q. 151. What make?

A. 151. American Foundry & Furnace Company, Bloomington, Illinois.

Q. 152. I show you a picture marked for identification Mercoid Exhibit B-2 and ask you if you know what that is?

A. 152. I do.

Q. 153. Where was that taken?

A. 153. On the same premises—the Ned Dolan residence.

Q. 154. Is that in the same room as the furnace?

A. 154. No, an adjoining room.

Q. 155. Does the Installation and Service Manual of 1928, Mercoid Exhibit E-2, show a wiring diagram of this installation?

A. 155. I don't think so—no.

Q. 156. Is that a standard installation?

A. 156. No—a special.

By Mr. Moore: The two photographs identified by the witness are introduced in evidence as MERCOID EXHIBIT B-1 and MERCOID EXHIBIT B-2.

(The two photographs were accordingly marked Mercoid Exhibit B-1 and Mercoid Exhibit B-2, and made a part of this deposition.)

By Mr. Moore:

Q. 157. I believe you said this was a special instal-
966 lation, did you not?

A. 158. Yes, sir.

Q. 159. How are drawings prepared for special installations?

A. 159. It depends upon the wishes of the purchaser of the equipment; also the manufacturer of the furnace as to just what control system will be used. This particular control system was worked out between Louis Lartz and myself to function to the satisfaction of Mr. Dolan and all concerned.

Q. 160. I show you a photostat of a drawing marked for identification Mercoid Exhibit F-1 and ask you if you know what that is. It also bears the sheet number A-198.

A. 160. This is a special control system and wiring diagram worked out for a particular installation, using our Model "G" burner.

Q. 161. Now by whom was that worked out?

A. 161. By myself, with the assistance of Louis Lartz.

Q. 162. And who made this drawing?

A. 162. Herschel Gibson made the tracing.

Q. 163. Whose initials appear opposite "Drawn by"?

A. 163. Drawn by Herschel V. Gibson.

Q. 164. And what date appears on this drawing?

A. 164. May 5, 1927.

Q. 165. And whose initials are opposite "Approved by"?

A. 165. Those are my initials—my signature.

Q. 166. Have you any recollection as to the nature
967 of the building in which this installation was applied?

A. 166. I do, for the reason of the building plan.

Q. 167. And what was it a building plan of?

A. 167. This was a foundation plan for a garage building of large size, with garage quarters, office and waiting room at the front of the building.

By Mr. Moore: I will question this witness more in detail in regard to this installation later.

By Mr. Moore:

Q. 168. I show you another drawing bearing the sheet number JA-258 and marked for identification Mercoid Exhibit G-1, and ask if you know anything about this?

A. 168. I do.

Q. 169. Who got up this drawing, if you know?

A. 169. If I recall correctly, I made this pencil sketch;

and in the absence of Mr. Gibson the tracing was made by a draftsman in the Engineering Department—E.H.S.

Q. 170. And is he still in the employ of the Oil-O-Matic?

A. 170. He is not.

Q. 171. Is there anything to indicate on this drawing the purpose of this installation?

A. 171. This wiring diagram shows the method of control when two or more burners are used in connection with unit heaters.

968 By Mr. Moore: I will question this witness later in regard to the details of this construction.

By Mr. Moore:

Q. 172. I believe you stated that last Wednesday you inspected the Evangelical Church installation in company with Louis Lartz and the photographer of the United Photo Company, and you have identified the pictures that were taken by the photographer at that time. Do you know when these controls were installed in this furnace?

A. 172. The Evangelical Church installation was billed out—I don't know exactly the date, but the date would be shown on the invoice.

Q. 173. I show you a photostat of the invoice marked Mercoid Exhibit C-1 and will ask you if that brings any recollection to your mind?

A. 173. That is a reproduction of the original invoice for this installation.

Q. 174. What is the date on this invoice?

A. 174. The date is not shown, but there is a pen marking "6 18 25."

Q. 175. I show you another photostat of another invoice marked Mercoid Exhibit C-2, and will ask you if that has anything to do with this job?

A. 175. The original invoice previously referred to,
969 that is Exhibit C-1, was an invoice resulting from the order taken by the salesman whose name is shown as Parkmeier. That order was turned in for a standard warm air furnace installation. As was my custom, I inspected this proposed installation, finding it necessary to install additional controls as they wanted the system to operate completely automatic. The invoice dated 2 2 26, Mercoid Exhibit C-2, is a reproduction of the invoice for the controls which were ordered out and installed on this contract upon my recommendation.

Q. 176. I notice that this invoice, Mercoid Exhibit C-2, specifies a Federal Mercoid furnace control and a Special

Federal Mercoid control. What is the special Mercoid furnace control referred to?

A. 176. This invoice was typed by one of the boys in our Order Department and who usually referred to this particular control, known as the Federal Mercoid furnace control; as "special" when the control was to be used for fan starting or, in other words, with tube reversed.

Q. 177. That is the same tube then as shown in Sheet No. A 67, Mercoid Exhibit E-2, is it?

A. 177. Yes.

Q. 178. I show you another exhibit marked Mercoid Exhibit C-3, and ask you if that has anything to do with this installation?

970 A. 178. This invoice shows a charge of $14.75 to the Evangelical Church under date of 2 22 30 for replacing the fan control which I recall outlived its usefulness and made necessary a replacement.

Q. 179. Now referring to the photograph, Mercoid Exhibit A-3, which shows the door of the furnace in the Evangelical Church, they are two different types of controls?

A. 179. Right.

Q. 180. Referring to the invoice dated 2 22 26, Mercoid Exhibit C-2, which is the Federal Mercoid furnace control shown on the photograph?

A. 180. The trombone control, mounted in the lower position on the door.

Q. 181. Is the special Federal Mercoid control shown on this invoice, Mercoid Exhibit C-2, as originally installed in the Evangelical Church, shown in the photograph, Mercoid Exhibit A-2?

A. 181. No.

Q. 182. What is shown on the door in the photograph, Mercoid Exhibit A-3?

A. 182. The later type of furnace control with tube reversed, which replaced the trombone type of control that was originally installed on this door.

Q. 183. Then does the invoice, Mercoid Exhibit
971 C-3, have any relation to the control shown on the photograph marked Mercoid Exhibit A-3?

A. 184. This is the invoice authorized on installation of the later type of control to replace the trombone type of control formerly installed.

Q. 185. Do you know who installed this later control that you just referred to on the door.

A. 185. I do.

Q. 186. Who?

A. 186. I instructed Louis Lartz to make the change, and he installed it.

Q. 187. When you visited the Evangelical Church a week ago today with Mr. Moore, Mr. Lartz and the photographer, after the pictures were taken did you do anything else to put the system in operation?

A. 187. Tested it out.

Q. 188. How did you do that?

A. 188. I put the switch on the control box in the "on" or starting position. I then moved the thermostat to the higher temperature, the location of which was just outside the door.

Q. 189. What happened then?

A. 189. The burner started operating.

Q. 190. In the natural operation of the furnace, what would be the next thing to happen?

972 A. 190. The fan would start to operate when the temperature in the bonnet reached a predetermined state of the control.

Q. 191. Did you wait until the temperature increased to that degree, or did you do anything else?

A. 191. No, Mr. Lartz removed the cover from the furnace fan control and moved the mercury tube to the "on" contact position starting the fan.

Q. 192. Did you make any other tests?

A. 192. Yes, Louis Lartz then disconnected the furnace limit control from the bracket and tipped the control to the side to open the circuit, which stoppped the operation of the burner.

Q. 193. What happened to the fan?

A. 193. The fan continued to operate.

Q. 194. What did that indicate to you?

A. 194. That the control system was exactly as we installed it as far as the operation was concerned originally. I might add that the manufacturer of the furnace, P. H. Magirl Company, wanted this control system so installed so that when the burner was shut off from either thermostat, to keep the fan in operation until the furnace temperature was reached to the "off" contact setting of the furnace fan control, and that is the way we found it operating.

Q. 195. Did you have a wiring diagram made of this operation in the Evangelical Church?

973 A. 195. No.

Q. 196. Did you have one made for your inspection?

A. 196. We had two wiring diagrams made.

Q. 197. Was this before or after the inspection?

A. 197. Oh, I had a wiring diagram made after the inspection.

Q. 198. And who was that made by?

A. 198. Louis Lartz.

Q. 199. Who made the actual drawing, do you know?

A. 199. Herschel V. Gibson.

Q. 200. What kind of a diagram was made by Louis Lartz?

A. 200. A pencil sketch.

Q. 201. I show you here a photostat of a drawing entitled, "Wiring Diagram of installation in Evangelical Church, Lee and Front Street, Bloomington, Illinois when inspected October 2, 1940," and also the initials "O.H.P." following the notation "Approved by," and ask you if that is the diagram that you have just referred to?

A. 201. It is.

By Mr. Moore: The drawing or photostat of the drawing identified by the witness is offered in evidence as MERCOID EXHIBIT H-1.

(The drawing or photostat of the drawing was accordingly marked Mercoid Exhibit H-1, and made a part of this deposition.)

974 By Mr. Moore:

Q. 202. I notice on this drawing, Mercoid Exhibit H-1, there are two Mercoid room thermostats shown. Can you tell me which thermostat represents the thermostat up in the church?

A. 202. The one to the right.

Q. 203. And the one to the left, where was that located?

A. 203. Just outside of the furnace room door in the quarters used for entertainments and Sunday School room.

Q. 204. I notice there are wires leading from these two thermostats to a square on the drawing indicated as "Burner Control Panel. Is that burner control panel illustrated in the photograph, Mercoid Exhibit A-1?

A. 204. It is.

Q. 205. Where is it shown there?

A. 205. Mounted directly over the fan housing of the burner and in front of the lawn mower.

Q. 206. I notice that there are two instruments shown on left of the drawing, both of which are marked "Mer-

coid Furnace Control," and I ask you if they are illustrated in any of the photographs introduced in evidence?

A. 206. They are.

Q. 207. Where are they shown?

A. 207. They are in the photograph marked Mercoid Exhibit A-3, mounted on the cast iron door.

975 Q. 208. Did you state what that cast iron door opens into?

A. 208. It opens into the plenum chamber, as we call it, or the warm air space housed in the brick wall and the door, inside of which is the furnace heating element.

Q. 209. And that is shown in Mercoid Exhibit A-4, is it not?

A. 209. It is.

Q. 210. I notice that the lower Mercoid furnace control on the drawing, Mercoid Exhibit H-1, is connected by wires to the burner control panel. Can you indicate the purpose of this Mercoid furnace control?

A. 210. That is the furnace limit switch to cut off the burner when the maximum furnace temperature is reached.

Q. 211. What is the purpose of the Mercoid furnace control shown at the upper left-hand of this drawing?

A. 211. This control functions from temperature rise or fall in the same manner as the furnace control, with the exception that it closes the circuit on temperature rise, whereas the lower control opens the circuit on temperature rise.

Q. 212. I notice there are some wires leading from this upper control. Where do they go to?

A. 212. To the Allen-Bradley relay.

Q. 213. That is the little square shown at the bottom of drawing marked "Relay"?

976 A. 213. Right.

Q. 214. I also notice there are three lines leading from this relay. Where do they go to?

A. 214. They go to the entrance switch to the building.

Q. 215. Is that shown on the drawing?

A. 215. Yes.

Q. 216. I also notice there are two lines leading from the burner control panel. Where do they go to?

A. 216. To the entrance switch.

Q. 217. Then the burner control panel is connected up independently of the relay, is that correct?

A. 217. Correct.

Q. 218. And the relay—there are two lines leading from that. Where do they go to?

A. 218. To the fan motor.

Q. 219. And that is the motor shown on the photograph marked Mercoid Exhibit A-2, is that right?

A. 219. That is correct, and the motor is a 2 horse power motor, which requires a heavy duty relay.

Q. 220. Why are there three wires leading from the switch to the relay and only two wires leading from the relay to the Mercoid furnace control and to the fan motor?

A. 220. Due to the heavy load of the fan motor I take it, from the wiring diagram, that we used three wires of 220 volts on this installation. Mr. Lartz can, however, ex-
977 plain that better than I can.

Q. 221. What position of the burner and control is shown upon this drawing, marked Mercoid Exhibit H-1?

A. 221. The Mercoid furnace or limit switch is shown in the "running" or cold position. The Mercoid fan control is shown in the "off" circuit position, the fan not operating. There is no indication, however, whether the thermostats there are on circuit or off circuit.

Q. 222. What happened when either one of these thermostats called for heat?

A. 222. The burner starts operation.

Q. 223. Can you produce a photostat similar to Mercoid Exhibit H-1, which indicates the circuit in red, which is established when the room thermostat closes?

A. 223. This drawing (referring to Exhibit H-2) shows the control circuit through the burner control panel.

Q. 224. Can you follow the circuit from the hand switch?

A. 224. The current flow from the left wire at the entrance switch would be through the burner control panel and in series with Mercoid furnace control and thermostat back to the center or ground wire at the entrance switch. The detail wiring, however, is not shown in the control panel but this circuit, when the controls are in the position
978 they are shown, results in the burner operating until such time as either the furnace control opens the circuit or the room thermostat.

Q. 225. I notice on this drawing that the lower room thermostat is marked in the "on" position.

A. 225. Right.

Q. 226. How is the other thermostat connected in relation with the one that is marked in the "on" position?

A. 227. In parallel.

Q. 228. What does that mean?

A. 228. It means that either thermostat may close the circuit or open the circuit, and if either circuit is in the "on" position the burner would function.

By Mr. Moore: The drawing showing the circuit established upon the closing of a room thermostat, just produced by the witness is offered in evidence as MERCOID EXHIBIT H-2.

(The drawing produced by the witness was accordingly marked Mercoid Exhibit H-2, and made a part of this deposition.)

By Mr. Moore:

Q. 229. In this drawing, Mercoid Exhibit H-2, what is the position of the upper Mercoid furnace control?

979 A. 229. Off contact.

Q. 230. Now what happens after the oil burner has been operating for a short time?

A. 230. The control referred to would make contact, starting the fan motor.

Q. 231. Can you produce a drawing illustrating the circuit that is established when the upper Mercoid furnace control closes showing this circuit in blue?

A. 231. Yes. (Witness produced drawing.).

Q. 232. The circuit shown in red on this drawing you have just produced is the same as the red circuit shown on Mercoid Exhibit H-2, is it not?

A. 232. Right.

Q. 233. Now will you kindly trace the circuit shown in blue on this drawing from the hand switch?

A. 233. The current flows from the hot wire in the hand switch through Mercoid furnace control, and the relay is also energized, and with the furnace fan switch in the "on" contact position this closes the relay, starting the fan motor.

By Mr. Moore: The drawing just produced by the witness showing the blue circuit established to operate the fan motor, is offered in evidence as MERCOID EXHIBIT H-3.

980 (The drawing produced by the witness was accordingly marked Mercoid Exhibit H-3, and made a part of this deposition.)

By Mr. Moore:

Q. 234. When the room thermostat is still calling for heat, the Mercoid limit control is closed and the Mercoid

fan is closed and the temperature within the bonnet of the furnace increases above that desired, what happens?

A. 234. The burner stops operation when the Mercoid limit control opens the circuit.

Q. 235. Can you produce a drawing which shows the Mercoid limit control in the "off" position and the circuit or circuits that remain in position indicated in blue?

A. 235. Yes. (Witness produces drawing.)

Q. 236. In this drawing, the circuit indicated in red on Mercoid Exhibit H-3 is no longer energized, is it?

A. 236. Right.

Q. 237. And the circuit from the furnace fan switch to the fan motor in this drawing remains the same as that shown in Mercoid Exhibit H-3, is that correct?

A. 237. Right.

By Mr. Moore: The drawing just referred to and produced by the witness showing only the circuit from the fan control to the fan motor in blue, is offered in evidence
981 as MERCOID EXHIBIT H-4.

(The drawing produced by the witness was accordingly marked Mercoid Exhibit H-4, and made a part of this deposition.)

By Mr. Moore:

Q. 238. Then I am to understand, am I, that when the limit control shuts down the oil burner the fan will continue to operate, is that correct?

A. 238. It will continue to operate until such time as the Mercoid furnace fan control opens the circuit on a temperature drop.

Q. 239. What causes this temperature drop?

A. 239. The circulation of the air produced by the booster fan through the burner, sending the heated air into the room.

Q. 240. When this happens then, the fan control assumes the position shown in drawing marked Mercoid Exhibit H-1, is that correct?

A. 240. That is correct.

Q. 241. Now in the drawing marked Mercoid Exhibit H-4 you show the limit control in the open position?

A. 241. Right.

Q. 242. What happens after the furnace fan control has returned to the open position?

A. 242. With the controls adjusted for the tempera-
982 tures desired to either shut off the furnace to start or stop the fan, the natural operation would be that the

burner would again start operating when the furnace limit control closes the circuit, provided the thermostat was still calling for heat or in the "on" position. If, however, the thermostat was satisfied the Mercoid limit control would make contact, but the burner would not start operating because of no circuit through the room thermostat.

Q. 243. Then the position of the limit control would be the same as that shown in Mercoid Exhibit H-1, would it?

A. 243. Mercoid Exhibit H-1 shows the limit control in the "on" or the starting position—right.

Q. 244. When you, Mr. Moore and Mr. Lartz and the photographer visited the Dolan residence on Mercer Avenue, after the pictures were taken what did you do?

A. 244. We put the system in operation.

Q. 245. Did you trace the wiring to the room thermostat?

A. 245. We did.

Q. 246. Where did you find the room thermostat?

A. 246. In the dining room.

Q. 247. What other controls did you find in the Dolan furnace room?

A. 247. The furnace limit control, the stack safety switch and an additional single circuit switch in the smoke pipe in the adjoining room.

983 Q. 248. Was there a booster fan in connection with this installation?

A. 248. Yes.

Q. 249. Is that shown in the photograph marked Mercoid Exhibit B 1?

A. 249. No, it is located in the back end of the furnace in an adjoining room, directly back on the rear wall shown in this picture.

Q. 250. I notice there is a control shown at the top of the furnace in this Mercoid Exhibit B 1. Do you know what that is?

A. 250. That is a Mercoid control manufactured by the Federal Gauge Company, and previously referred to as the trombone type of control.

Q. 251. Do you see part of the trombone in that picture?

A. 251. I do.

Q. 252. Where is it?

A. 252. It is to the upper right of the furnace and directly in front of the large relay air duct.

Q. 253. What is that control that is shown on the left panel of the furnace, do you know?

A. 253. That is a stack safety switch, a special construction used in connection with the Honeywell D.S.S. motor control switch mounted on the burner.

Q. 254. That is not shown in this photograph, is it?

984 A. 254. No.

Q. 255. Is any part of the burner shown in this photograph?

A. 255. Only the draft pipe inserted through the ash pit door, in the lower part of the picture.

Q. 256. Why did you insert a stack safety in a part of the furnace and not in the stack?

A. 256. This stack safety has the helix or temperature element in the fire travel of the furnace. It was installed in this so as to get quicker action on the heating element and control rather than in the customary installation in the smoke pipe. This is a large industrial type of furnace seldom used in a residence, and the smoke pipe temperature is very low due to the high efficiency.

Q. 257. Is this control marked Mercoid Exhibit B-2 in the photograph?

A. 257. That control, as I recall, was incorporated in our original wiring diagram and installed in the smoke pipe for the purpose of closing the circuit on temperature rise, and was used in connection with starting the fan.

Q. 258. Referring again to the Mercoid control in the photograph, Mercoid Exhibit B-1, it appears to be somewhat different from the drawings illustrated in the Mercoid catalog, Mercoid Exhibit E-1. Can you tell what the difference is?

985 A. 258. This control was the standard Figure 50 Federal Mercoid furnace control. In order to accomplish the desired operation of the control system, Louis Lartz installed an additional mercury tube on the movable bracket to which the original tube was installed, thereby tilting both tubes at the same time.

Q. 259. Can you tell from that photograph what type of mercury tube switch is in the upper type?

A. 259. The upper type appears to be a 2-circuit type.

Q. 260. Is that a standard with the Mercoid M-50?

A. 260. Yes, illustrated on Federal Gauge Company bulletin, Mercoid Exhibit E-1, page 4, Figure 2.

By Mr. Moore: Let the record show that the witness is referring to Mercoid Exhibit E-1.

By Mr. Moore:

Q. 261. Do you know when this installation was made in the Dolan residence?

A. 261. Only by referring to the order or invoice and billing.

Q. 262. I show you a photostat of invoice marked Mercoid Exhibit D-1 and ask if that has any meaning to you?

A. 262. From this I recognize the original invoice and also the name "Irvin" in the invoice, which recalls to my mind that Ina Irvin sold this installation to Neddy 986 Dolan. This invoice No. 7692 states: "To be installed when notified" and is an order for special controls, including Honeywell switch and safety with clock thermostat.

Q. 263. Do you find a clock thermostat in the Dolan residence?

A. 263. Yes.

Q. 246. I call your attention to a photostat of another invoice No. 10847, marked Mercoid Exhibit D 2, and ask if you recognize that?

A. 265. The bricking in the furnace was changed and repairs made on March 11, 1927, this invoice showing the material used.

Q. 266. What residence was that?

A. 266. Ned Dolan, 301 Mercer Avenue, Bloomington, Illinois.

Q. 267. And that is the residence in which the photographs, Mercoid Exhibits B-1 and B 2, were taken?

A. 267. Right.

Q. 268. I call your attention to the photostat of a ledger sheet marked Mercoid Exhibit D 3, and which is entitled "Ned Dolan, Mercer Avenue, City." Are there any entries in there that would identify themselves to you?

A. 268. This shows that there was a $50.00 deposit made with the order and that Ned Dolan was given credit 987 for $50.00 on June 1, 1926. I also note that on invoice No. 7692, July 27, a statement for the complete installation, which is evidence to me that the installation was completed, as was our rule before the customer was invoiced.

Q. 269. Did you conduct any demonstration of the operation of this burner after the photographs were taken?

A. 269. We did.

Q. 270. After inspecting this installation, did you have a wiring diagram made?

A. 270. I did, yes.

By Mr. Moore: I will question the witness Lartz, to be called later, as to this demonstration.

By Mr. Moore:

Q. 271. I will show you a drawing here marked across the top "Wiring Diagram of installation in residence of Ned E. Dolan, 301 North Mercer Avenue, Bloomington, Illinois when inspected on October 2, 1940." This drawing is very similar to the other drawings and bears at the bottom the initials "H.V.G." following the notation "Drawn by," and "O.H.P." following the notation "Approved by," and the date "October 2, 1940." Do you know by whom this drawing was made?

A. 271. Mr. Louis Lartz made a pencil sketch of this control system as originally installed on the Ned Dolan
988 premises, and this shows the wiring connection to the various controls and control system.

Q. 272. This wiring diagram was made after checking the wiring to the motor, too, was it not?

A. 272. Right.

Q. 273. And who made the drawing that you have in your hand?

A. 273. Herschel V. Gibson.

Q. 274. And whose initials are those following "Approved by"?

A. 274. "O.H.P." are my initials.

By Mr. Moore: The wiring diagram just produced by the witness is offered in evidence as MERCOID EXHIBIT I-1.

(The wiring diagram just produced was accordingly marked Mercoid Exhibit I-1, and made a part of this deposition.)

By Mr. Moore:

Q. 275. What is the square in the center marked "Honeywell D8S Motor Switch"?

A. 275. That is the Honeywell motor switch which starts and stops the burner, depending upon the closing or opening of the various circuits of the controls.

Q. 276. And is that the motor switch which you said was mounted upon the Oil-O-Matic burner?

A. 276. It is.

989 Q. 277. At the top there is a notation, "Honeywell Room Thermostat." That is the thermostat you found on the dining room wall of the Dolan residence.

A. 277. That indicates a series 20 low voltage Honeywell room thermostat.

Q. 278. I notice that three wires lead from this thermostat while there were two wires in the other thermostat you have referred to as shown on the controls. Why are three wires used in this system?

A. 278. When an Oil-O-Matic was purchased, the purchaser had the choice of either a clock type of thermostat or a thermostat without clock. The clock was for the purpose of automatically reducing night temperatures and restoring the temperature to the higher or day-time temperature in the early hours of the morning. Ned Dolan wanted a clock thermostat, so the Honeywell series 20, clock thermostat was used on all such installations. This is a 3 wire low voltage thermostat.

Q. 279. What is shown on the right hand side of the drawing marked "Mercoid Furnace Control"?

A. 279. This control was originally Figure 50 with additional tube as previously referred to, and shown in photograph, Mercoid Exhibit B 1.

Q. 280. That is the upper tube in this picture, is it?

990 A. 280. I previously said that the additional tube was installed at the bottom of the control.

Q. 281. And that is the tube that is shown in this picture below the 2 circuit tube, is it?

A. 281. No, this control was evidently ordered as a standard Figure 50 furnace control. Instead of the additional tube being installed at the lower part of this control, the 2 circuit tubes referred to as Figure 2 on Mercoid Bulletin, E-1, page 4, was added to and installed by Louis Lartz at the top of this control as shown in the wiring diagram marked Mercoid Exhibit I-1.

Q. 282. And what is the mercury tube switch shown at the left-hand side of the control under the notation "Honeywell Stack Switch"?

A. 282. That is a standard Honeywell stack switch used on the regular installation as a safety switch, but in this case installed in the smoke pipe, using only the 10 ampere tube, the control having originally two mercury tubes and this tube to close the circuit on temperature rise. On this installation we used this control in series paralled with the Mercoid furnace control to operate the fan motor.

Q. 283. And is that shown in either of the photographs of the Dolan residence?

A. 283. The Honeywell stack switch, Mercoid Exhibit I-1, is the one referred to as Mercoid Exhibit B 2.

991 Q. 284. Is the part marked "Relay" on this drawing shown on either of the photographs in evidence as Exhibit B-1 or B-2?

A. 284. I do not see it in Exhibit B-1.

Q. 285. Is the part marked "Fan Motor" shown in either of these photographs?

A. 285. No.

Q. 286. I believe you stated where the fan was located, did you not?

A. 286. I did.

Q. 287. And where was it located?

A. 287. In the back end of the furnace in an adjoining room, on the other side of the rear wall, shown in Mercoid Exhibit B-1.

Q. 288. Is Louis Lartz more familiar with this particular hook up than you?

A. 288. He is.

By Mr. Moore: I will question the witness Lartz later in regard to the particular circuits established by the operation of the various controls illustrated in the drawing, Mercoid Exhibit I-1.

By Mr. Moore:

Q. 289. Referring now to the wiring diagram in the 992 garage, Mercoid Exhibit F-1, will you explain a little bit more fully whether you find any room thermostats illustrated in this diagram?

A. 289. Three Mercoid high voltage room thermostats.

Q. 290. And where are they located?

A. 290. One in the garage, one in the office, and one in the waiting room.

Q. 291. What are those two squares in the center of the drawing, over the Allen-Bradley relay switches?

A. 291. They are wiring diagrams of two Allen Bradley relay switches showing the internal wiring diagram.

Q. 292. Are these Allen Bradley switches the same as you have heretofore referred to?

A. 292. Yes.

Q. 293. Do you find a heating plant located in the garage?

A. 293. Yes, in the upper left hand corner.

Q. 294. What are the two articles indicated by arrows on lines leading from the notation "Fans"?

A. 294. The one represents a large booster fan for heating the garage; the other a large booster fan for heating

the office and the waiting room and two toilets adjoining the waiting room.

Q. 295. Can you indicate which fan heats the waiting room and rest rooms?

993 A. 295. Yes, the fan which is shown mounted on the heating plant of the furnace in the upper left-hand corner.

Q. 296. What does that fan lead into?

A. 296. That fan is connected to a warm air duct system to the office, waiting room and two toilets.

Q. 297. That is shown by the parallel lines on the drawing leading from the heating plant to those rooms, is it?

A. 297. Right.

Q. 298. What does the other fan lead into?

A. 298. The other fan is a larger fan—a booster—for heating the garage.

Q. 299. And does that lead into anything shown on the drawing?

A. 299. That leads into a large duct, terminating just inside the garage.

Q. 300. The end of this duct is the part indicated in the dotted line portion of duct leading to the office, is it?

A. 300. Right.

Q. 301. Is there anything on this drawing to indicate an oil burner?

A. 301. The control box on burner shown in the lower left hand corner.

Q. 302. That is the square shown around that notation?

A. 302. Right.

994 Q. 303. Where is that control box located actually in the installation?

A. 303. It is mounted on the fan housing on the Model "G" burner.

Q. 304. Is that the same control box you referred to in the picture, Mercoid Exhibit A 1, of the installation in the Evangelical Church?

A. 304. Right.

Q. 305. That is the box shown in the front of the handle on the lawn mower?

A. 305. Right.

Q. 306. Are there any controls shown hooked up in circuit with the control box on the burner?

A. 306. Yes stack safety switch and high temperature limit control and operating control and fan switch combination.

Q. 307. The stack safety switch you referred to is the one shown at the bottom of the drawing, marked "Stack Safety," is it?

A. 307. Right.

Q. 308. What is the other switch shown above the control box on the burner and the heating plant?

A. 308. The same control but used for a different purpose.

Q. 309. What is the switch shown as a 2-circuit switch above the notation "140-180"?

995 A. 309. That is a Federal Mercoid warm air control of the trombone type with two circuit tube.

Q. 310. What is the switch shown over the notation, "350°"?

A. 310. That is the standard high voltage temperature range Mercoid Federal Gauge trombone type control used as a limit control or emergency high temperature limit switch.

Q. 311. What is the control between the heating plant and the office above the notation "140°-180°"?

A. 311. That is the Mercoid Federal Gauge Company trombone type of control previously referred to as a fan control.

Q. 312. Now how are the room thermostats in the office and waiting room connected to the relays?

A. 312. In series parallel.

Q. 313. To which relay are they connected to?

A. 313. The relay shown on the right.

Q. 314. And to what is the room thermostat shown in the garage connected to?

A. 314. The relay on the left.

Q. 315. Then if either of the room thermostats in the office or in the rest room were closed, a circuit would be established, is that right?

A. 315. Correct.

Q. 316. Now can you produce a diagram similar to 996 Mercoid Exhibit F-1 in this circuit that is established upon the closing of the room thermostat in the office, in red?

A. 316. Yes, here it is.

By Mr. Moore: The drawing showing the circuit in red established upon the closing of room thermostat in the office is offered in evidence as MERCOID EXHIBIT F 2.

(The drawing just produced was accordingly marked Mercoid Exhibit F 2, and made a part of this deposition.)

By Mr. Moore:

Q. 317. Will you please trace the circuit established as shown in red from the source through the various instruments or controls and burner?

A. 317. When making up this wiring diagram and working out the control systems, of which there are two separate control systems, it was necessary to use Allen-Bradley relays. The motor on the burner is ½ horse power, and large motors were used on the fans requiring relays to be incorporated in the circuit, using high voltage thermostats for pilot control. The purchaser of our equipment insisted upon having the closest possible control temperature in the office and waiting room, which this circuit shows. The thermostat in this case is in the absolute control of the furnace temperature and fan. In other words, when the thermostat is satisfied, the burner operation and fan
997 operation will stop, or heat will be maintained in the office from the booster fan until the room temperature is satisfied. Tracing this circuit in the current flow from the street or meter to the wire marked "hot," is to the line under terminal on top of relay. The current flow is then through the thermostat in the office and back through the relay to hold-in coil in the relay to ground. When this coil is energized the relay is pulled in, closing the high voltage circuit directly through to the burner equipped with a ½ horse power motor. This current flow is through the two limit controls to the control box on furnace and through the control box to the burner motor and stack safety.

Q. 318. Why did you have two limit controls in this circuit?

A. 318. The control on the left marked "140 180," the marking represents the catalog marking for that particular control at that time, referred to as "Temperature range." This control is adjustable for temperatures above or below that rating. This was adjusted to a higher temperature than that shown and used as an operating control to shut off the burner, the same as a furnace limit control, the control on the right marked "350" being installed in the circuit for use in case of emergency only.

Q. 319. When would such an emergency arise?

A. 319. If the mercury tube on the operating control
998 should lose the gas due to frequent use, which would occur in this case, it would be possible for the mercury to remain on the tube, even though the tube were

tilted in the opposite direction. We did not want that to happen, so installed in this case an additional furnace limit switch to function at a higher temperature over and above the operating control.

Q. 320. Did you state what type this operating control was?

A. 320. This is the regular Federal Mercoid standard Figure 50 control with two-circuit tube shown on page 4 of the Mercoid Bulletin, Mercoid Exhibit E 1.

Q. 321. Have you had any experience with these Figure 50 standard controls failing to operate?

A. 321. No.

Q. 322. Well then why was the necessity of this additional limit control?

A. 322. It was not necessary to put that control in the circuit. This control would only function in case of possibly the fan motor or the booster failing to operate to cool the furnace. In fact the control was only for use in case of emergency and was not exactly necessary.

Q. 323. Now after the room thermostat is closed and this red circuit has been established for a little while, what happens?

A. 323. The fan control shown at the top and incorporated in the wiring to the booster fan in the office would also close the circuit and start the booster fan operating and delivering heat to both the office and the waiting room.

Q. 324. In this Mercoid Exhibit F 2 the furnace fan control is shown in the open position?

A. 324. Right

Q. 325. Can you produce a drawing showing the Mercoid fan control in the closed position and the circuit established thereby in blue?

A. 325. Yes. (Witness produces drawing.)

By Mr. Moore: The drawing just produced by the witness illustrating the circuit and the fan control in blue, is offered in evidence as MERCOID EXHIBIT F 3.

(The drawing just produced was accordingly marked Mercoid Exhibit F 3, and made a part of this deposition.)

By Mr. Moore:

Q. 326. I notice that in this drawing, Mercoid Exhibit F 3, the same circuit is shown in red as is shown in Mercoid Exhibit F 2, but there is an additional circuit shown in blue. Will you please trace this blue circuit?

A. 326. This circuit in blue shows the furnace limit con-

trol with reverse tube in the closed position or "on" contact, in which case the current would flow to the booster fan and start the booster fan operating.

1060 (Witness continuing) This fan would deliver heat to the room in which the thermostat was located and in case the room thermostat was satisfied, the thermostat would open the circuit and the fan would cease operating, and at the same instance the burner would cease operation.

Q. 327. If the room thermostat remained closed and the burner continued to operate until the Mercoid limit control opened on account of excessive heat in the furnace, what would happen?

A. 327. The burner would cease operation.

Q. 328. Would the stopping of the burner in any way affect the operation of the furnace fan?

A. 328. No.

Q. 329. I will ask you if you can produce a drawing indicating the circuits from the room thermostat in red and to the furnace fan in blue when the circuit to the burner has been broken by the operation of the limit switch?

A. 329. Yes.

By Mr. Moore: The drawing produced by the witness illustrating the circuit from the room thermostat in red and to the furnace fan in blue, which remains energized when the limit control has opened the circuit to the burner, is introduced as MERCOID EXHIBIT F-4.

1061 (The drawing just produced by the witness was accordingly marked Mercoid Exhibit F 4, and made a part of this deposition.)

By Mr. Moore:

Q. 330. Now with this diagram before you, will you please trace the red circuit from the meter and the blue circuit from the relay?

A. 330. The "hot" wire from the street or meter is connected to the right hand top terminal on the relay. From that it branches, one branch going through the thermostat and the hold in coil to ground; the other through the center bar of the relay to the furnace fan control switch; then to the booster fan on the furnace, and to ground through the relay.

Q. 331. With these two circuits, will the furnace fan control open the circuit to the fan when the room thermostat is calling for heat while the oil burner is idle?

A. 331. The answer is no.

Q. 332. What happens with the furnace fan control?

A. 332. The thermostat could be satisfied at this particular time while burner is at rest, and with the furnace fan control opening the circuit at the same time the thermostat opens the circuit, the reduction in temperature within the furnace, with controls properly adjusted,
1062 would resume burner operation before the furnace fan control broke the circuit. This would continue until the room thermostat was satisfied.

Q. 333. In other words, the furnace fan control would remain closed as long as the temperature in the bonnet of the furnace remained above that at which it is set, is that right?

A. 333. That is right.

Q. 334. In the event that the temperature in the office is satisfied, the thermostat will then open the circuit shown in red in Mercoid Exhibit F-4, would it not?

A. 334. Right.

Q. 335. And then the parts would in a short time return to the position shown in the drawing, Mercoid Exhibit F-1, is that correct?

A. 335. Right.

Q. 336. Referring now to this drawing marked for identification as Mercoid Exhibit G-1, do you know what that is?

A. 336. A wiring diagram of Sheet No. JA 258.

Q. 337. Will you please describe a little more in detail what this drawing represents?

A. 337. As I recall it, I received the request for a plant or control system using two or more boilers in conjunction with unit heaters for a large building, and this is the result of my efforts along that line, using Mercoid controls and Model "G" burners.

1063 Q. 338. What type of heating system was this?

A. 338. This was steam.

Q. 339. Now there are certain legends on the right hand side of this drawing, opposite numbers which are applied to the various parts. What does number "1" in the circle at the bottom of the drawing show?

A. 339. That represents four Oil-O Matic burners.

Q. 340. What does number "2" in the circle show?

A. 340. That represents four Mercoid boiler limit controls of the pressure type.

Q. 341. Are these Mercoid boiler controls shown in Mercoid Exhibit E-1?

A. 341. Yes, on page 2, Figure 31.

Q. 342. What is the figure marked "3" above these boiler controls?

A. 342. Mercoid 2-tube thermostats.

Q. 343. Is that illustrated in this Mercoid Exhibit E-1?

A. 343. The instrument is shown as Figure 21, but this shows only one Mercoid tube, but directly below, however, the two-pole type is shown as available at $50.00 each.

Q. 344. Then is this Mercoid two-tube thermostat what you call a "two-pole" thermostat?

A. 344. Right.

Q. 345. What is the circle indicated by the number "4"?

1004 A. 345. Number 4 is a Mercoid hot water control, back angle stem.

Q. 346. Is that drawing shown in Mercoid Exhibit E-1?

A. 346. It is shown on page 2 as Figure 37.

Q. 347. What are the squares at the top indicated by the number "5"?

A. 347. That represents four unit heaters are not shown except the two wires leading to the heater, the motors being on the back side. The motors were equipped with a fan for forcing the air through the unit heater, where it was warmed and delivered to the building.

Q. 348. Do these unit heaters have any other name?

A. 348. No doubt they have, but I do not recall.

Q. 349. Are they generally called unit heaters by people who are not engaged in this sort of work?

A. 349. They are generally referred to as unit heaters.

Q. 350. Did you ever hear the term "steam radiator"?

A. 350. Yes.

Q. 351. Does that apply to the steam radiator?

A. 351. A unit heater consists of a steam radiator with fan blower on one side, the blower operated by electric motor.

Q. 352. What are the squares indicated by the number "6"?

A. 352. That is a relay.

Q. 353. There are two of them. What was the pur-
1005 pose of these relays?

A. 353. The relays were used because of the large motor loads on burners and unit heaters, the load of which exceeded the rating of the mercury tubes in the thermostat, limit controls or Mercoid hot water control.

Q. 354. I believe you have said in your testimony that this drawing was prepared by Mr. Stempel?

A. 354. That is right. I would like to add that I have a faint recollection of this drawing being made up and the use of these particular relays; and that this control system so functions that the thermostat has absolute control of room temperature regardless of burner or fan operation. In other words, if burner and unit heater are both operating, they will both shut off in case the temperature is set at the room thermostat. The unit heater, however, will not function when the thermostat again calls for heat until such time as the burners have operated and the steam has entered the unit heaters.

By Mr. Moore: This drawing just referred to by the witness and heretofore marked for identification, is now introduced in evidence as MERCOID EXHIBIT G-1.

(The drawing just referred to by the witness was accordingly marked Mercoid Exhibit G-1, and made a part 1006 of this deposition.)

By Mr. Moore:

Q. 355. Can you produce a similar drawing indicating the circuit set up when the room thermostat closes, in red?

A. 355. Yes. (Witness produces drawing.)

Q. 356. And in this case trace the circuit only through one of the oil burners, preferably the one directly below the relay 6.

A. 356. The two red lines extending at the top of the relay will be the current from street or meter. The internal wiring is not shown in this relay, but current would flow from the street through the hot wire to the Mercoid thermostat and back through the hold in coil of the relay, to ground, which would close the circuit and start the burner into operation.

By Mr. Moore: The drawing just referred to by the witness is offered in evidence as MERCOID EXHIBIT G-3.

(The drawing just referred was accordingly marked Mercoid Exhibit G-3, and made a part of this deposition.)

By Mr. Moore:

Q. 357. Now after the oil burner is operating for a short time, what happens?

Q. 357. The fan control closes the circuit and starts the fan to operating.

1007 Q. 358. That is the control marked "4" as Mercoid hot water control?

A. 358. Right.

Q. 359. Can you produce a drawing that shows the cir-

cuit established when the Mercoid hot water control is closed, shown in blue?

Q. 359. Yes, here it is.

By Mr. Moore: The drawing just produced by the witness showing the fan circuit in blue is offered in evidence as MERCOID EXHIBIT G-4.

(The drawing just produced was accordingly marked Mercoid Exhibit G-4, and made a part of this deposition.)

By Mr. Moore:

Q. 360. I notice that in this drawing, Mercoid Exhibit G-4, the same circuit is illustrated in red as shown on the other drawing, Mercoid Exhibit G-3, and in addition a circuit is shown in blue. Will you kindly trace the circuit shown in blue?

A. 360. In the blue circuit a similar relay is used and a separate line switch. The current flow would then be from street or meter through the hot wire, into the relay and through the Mercoid hot water and control back, including the room thermostat with two tubes, the thermostat and the hot water control being wired in series with the 1008 hold-in coil on the relay. The relay would then close the circuit from the line wires through the motor on the unit heaters.

Q. 361. This shows just one heater in the blue circuit, does it not?

A. 361. Yes.

Q. 362. But the others would be in that circuit because they are connected in parallel, are they not?

A. 362. Right.

Q. 363. You show one set of red lines from relay 6 to the street and another set in blue leading to the other relay 6 to the street?

A. 363. Right.

Q. 364. Then the fan circuit is not in any way connected through the controls of the red circuit, is that right?

A. 364. That is right, but the two circuits while not connected together do terminate in the room thermostat.

Q. 365. Why.

A. 365. For the purpose of maintaining close control of the room temperature, the thermostat being in full control of both burner and fan operation.

Q. 366. Then if the room thermostat, which is shown on Mercoid Exhibit G-4 as closed, in which the blue circuit closes through the upper tube and the red circuit closes

through the lower tube, is opened normally after having been satisfied, then what happens?

A. 366. The burner and the fan stop operating.

Q. 367. In other words, the tubes would be tilted to the right and break the circuit through both tubes, is that correct?

A. 367. Correct.

Q. 368. You are referring to Figure 3 of the thermostat?

A. 368. Yes.

Q. 369. Now assuming that the circuit is established as shown in Mercoid Exhibit G-4, and the boiler control is operated by excessive pressure or temperature within the boiler to open, what happens then?

A. 369. The burner stops.

Q. 370. What happens to the fan?

A. 370. The fan continues its operation.

Q. 371. For how long?

A. 371. Until such time as the Mercoid hot water control located at the end of the steam main opens the circuit, or until the thermostat is satisfied. If, however, the hot water control was properly adjusted in relation to pressure adjustment on the boiler and limit control, the burner would start operating again from the limit control before the hot water control, used as a fan control, would open the circuit.

Q. 372. Can you produce a drawing showing the 1010 fan circuit in blue after the boiler control number "2" has opened the red circuit?

A. 372. Yes.

By Mr. Moore: The drawing just produced by the witness showing the fan circuit in blue after burner control has opened red circuit, is offered in evidence as MERCOID EXHIBIT G-5.

(The drawing produced by the witness was accordingly marked Mercoid Exhibit G-5, and made a part of this deposition.)

By Mr. Moore:

Q. 373. I believe you have already described when this blue circuit would be opened after the boiler control circuit had opened?

A. 373. Yes, I have.

Q. 374. Then if this blue circuit is opened, eventually all of the control will come back to all of the positions shown but Mercoid Exhibit G-1, would they not?

A. 374. Yes, sir.

1011 By Mr. Freeman: Cross-examination by the Defendant.

By Mr. Freeman:

X-Q. 377. I hand you Mercoid Exhibit B-2, and I believe you said that control, mounted in the stack, controlled the fan. Is that correct?

A. 377. Correct.

X-Q. 378. That is a Honeywell control?

A. 378. A Honeywell control.

X-Q. 379. Slip friction type?

A. 379. Right.

1012 X-Q. 380. So that upon rise in temperature sufficient to operate the switch the fan would move to "on" position?

A. 380. The control will move to that position.

X-Q. 381. And what will happen to the fan?

A. 381. The fan will start the relay circuit.

X-Q. 382. So that the relay circuit is closed upon rise in temperature?

A. 382. Within the smoke pipe—right.

X-Q. 383. So that if the switch closes the relay when the temperature in the stack is 100 degrees, you would then start the fan to operate, is that correct?

A. 383. Not necessarily.

X-Q. 384. What would start the fan?

A. 384. A rise in stack temperature of not less than 50 degrees over and above the stack temperature, at which time the burner would start to close the circuit in this control and start the blower.

X-Q. 385. So at one time the fan might start if the temperature in the stack did not fall below 50 degrees?

A. 385. Yes.

X-Q. 386. So that if the stack temperature were 300 degrees and the furnace moved or the burner moved to the "off" position or ceased operating, then, upon drop in stack temperature to 50 degrees, the fan would move to "off" postion?

1013 A. 386. Not the fan. This control would move to the "off" position.

X-Q. 387. As the result of the switch moving to "off" position, the fan would cease to operate?

A. 387. Not in all cases.

X-Q. 388. Tell us exactly what happened in the Dolan installation which you referred to this morning?

A. 388. In the Mercoid Exhibit I-1, the wiring diagram shows a control connected in parallel with the Honeywell stack switch. We have these two controls in parallel with the relay connected to the furnace fan motor or booster fan. If the Mercoid furnace control referred to on the upper right-hand side, should be in contact on the lower tube, the action of the Honeywell stack switch in the smoke pipe would have no function except controlling the fan motor, which would then be operated through the circuit to the Mercoid furnace control with the two tubes.

X-Q. 389. Then the Honeywell stack switch in accordance with the drawing, Exhibit I-1, serves no purpose other than the control of the fan?

A. 389. That is all.

X-Q. 390. So that as a matter of explanation you tell us there were two controls for the fan?

A. 390. Right.

X-Q. 391. Connected in parallel?

1014 A. 391. In series parallel.

X-Q. 392. What was the purpose of having two fan controls?

A. 392. The purpose of having two fan controls was to incorporate an additional tube in the furnace fan control to operate the booster fan and keep it functioning as long as the furnace was hot or the furnace limit control was in the position that it would be when reaching the maximum furnace temperature with burner not operating. The Honeywell stack switch shown on the left was installed for the purpose of starting—just a moment—for starting the fan through the relay after the burner started operating from the room thermostat, and after the temperature in the smoke pipe had reached a temperature rise of not less than 50 degrees. The fan would then start operating shortly after the burner started under normal operation.

X-Q. 393. And that rise in stack temperature of 50 degrees would occur even though the burner was still cold?

A. 393. Yes.

X-Q. 394. So that from the structure that you have just described, as shown on Exhibit I-1, the fan would start blowing cold air in the room to be heated?

A. 394. Not necessarily so; there is an interval between the starting of the burner and the stack temperature rise of 50 degrees, and that in this installation is exceptionally long.

1015 X-Q. 395. How long?

A. 395. We found when making this installation and installing the stack safety switch shown on the cleanout door (witness referring to Mercoid Exhibit B-1) that it was impossible to get a temperature rise in the smoke pipe quickly enough to actuate the stack control to prevent the Honeywell D.S.S. motor from recycling to the "off" or safety position. This made it necessary to install the stack safety control in the cleanout door of the furnace.

X-Q. 396. The stack safety was never mounted in the stack?

A. 396. Originally?

X-Q. 397. Yes.

A. 397. As I recall it was—yes.

X-Q. 398. Then when did you use the stack safety shown on Mercoid Exhibit B-2 for controlling the fan?

A. 398. That was installed later, and I am quite sure you will find that on an invoice. I do not recall the invoice. When the furnace was repaired and some changes made in the bricking, which will also be on the same bill, the Dolan stack safety control, as I recall it, was removed from the smoke pipe and installed in the cleanout door of the furnace for the reason that we had so many safety shut-downs due to the slow rise in stack temperature. This control, I believe, was billed on invoice with bricking, which has previously been shown as Exhibit D-2, dated April 11, 1927.
1016 The description of that particular control, I believe, is given on that invoice.

X-Q. 399. Then I take it that the stack switch mounted in the stack was removed and mounted on the furnace cleanout door?

A. 399. As I recall it, that was what happened.

X-Q. 400. Now were there any other changes made that you know of yourself?

A. 400. In the furnace itself, bricking changes were made. Do you mean in the control system?

X-Q. 401. In the control system.

A. 401. Yes, two that I recall.

X-Q. 402. And the drawing, Exhibit I-1, shows the installation as you inspected it on October 2, 1940?

A. 402. Yes.

X-Q. 403. Now tell us then just what the installation was when it was first installed in the summer of 1926. Tell us what controls were then used, the manner of connection, and the sequence of operation of the controls.

A. 403. The stack safety switch shown in the upper left-

hand of Exhibit B-1 has two tubes and is wired to the Honeywell D.S.S. motor switch. That control I note is not shown on this particular wiring diagram.

X-Q. 404. That was part of the original installa-
1017 tion?

A. 404. That was part of the original installation.

X-Q. 405. Now do you know when the Honeywell merger took place?

A. 405. I do not know.

X-Q. 406. And have you examined the control that you have just referred to and did you note that it is a Minneapolis Honeywell as distinguished from a Honeywell control?

A. 406. Yes, that is correct, I have noticed that previously.

X-Q. 407. You knew of the Honeywell Company?

A. 407. Right.

X-Q. 408. And you know now of the Minneapolis-Honeywell Company?

A. 408. Yes.

X-Q. 409. And I take it that if the Minneapolis-Honeywell merger took place after the summer of 1926, then the control you have referred to—at least three times this afternoon and evening—as part of the original installation, was not actually there, as you have heretofore testified, in the summer of 1926?

A. 409. I was referring to the type of control.

X-Q. 410. Then I take it that the controls have been changed.

A. 410. The particular control here may have been changed before the photo was taken.

1018 X-Q. 411. Then I take it that other controls may have since been changed before the photo was taken?

A. 411. I was in charge of local service during 1924. Up to about 1927, and as time went on, the local service was handled by a service manager supposedly under my supervision. Controls may have been changed without my knowledge, but I do know that when this installation was made the Honeywell D.S.S. motor switch and the Series 20 clock room thermostat could not possibly have operated without the Honeywell stack control with two tubes, of the type and structure as shown in the photograph, which was then manufactured by the Honeywell Company of Wabash, Indiana. It is possible that the cover was lost and that the Minneapolis-Honeywell cover was used later.

X-Q. 412. When did you first see the Dolan installation?

A. 412. When the installation was being made, and when it was completed. I saw it several times during the installation, but not again since then until the photograph was taken.

X-Q. 413. And as far as you are concerned, the controls now on Exhibit I-1 may have been substituted for other controls?

A. 413. That is possible—without my knowledge.

X-Q. 414. And likewise the sequence of operation might have been changed, as far as you know?

1019 A. 414. No, I don't think so. Louis Lartz made the wiring diagram in company with me when this installation was put in. We had some problems, such as low temperature stack. The Furnace Company had problems in heat distribution. A hot water coil was installed in the fire box to heat standing radiation, and some changes may have been made of a minor nature; but the control system, as I recall it, was only changed by removing the Honeywell shunt switch from the smoke pipe to the cleanout door and substituting, in the bracket on the smoke pipe, the Honeywell control as shown in the photo, Exhibit B-2.

X-Q. 415. Were there any other changes made as far as you know?

A. 415. There may have been. I was not closely in touch with the local service; my duties were too numerous to give it the time.

X-Q. 416. By the way, do you happen to have a circuit diagram of the Dolan installation other than the one prepared in October, 1940?

A. 416. I do not recall if a wiring diagram was made up for that installation. That was a special installation.

X-Q. 417. Well your company, the Williams Oil-O-Matic, do make wiring diagrams of special installations, does it not?

A. 417. Yes.

1020 X-Q. 418. And I take it that your records have been searched and that you did not find any special drawing of the Dolan installation, is that correct?

A. 418. I did not search the tracings carefully, but this is more or less a standard Honeywell control system, changed to fit the requirements for this fan motor control. We did not consider it necessary; simply by a little conversation with Louis Lartz this control system was worked out mentally.

X-Q. 419. Then when you said you and Louis Lartz worked out the wiring diagram, you actually had reference to some mental process rather than making drawings or diagrams as we understand them?

A. 419. We worked this out with pencil sketch, and did not consider or think it necessary to make a tracing of it because he understood me and I understood him, and we had the regular standard Honeywell wiring diagram that we used which covered most of this control system.

X-Q. 420. But as to the particular method of installation or sequence of operation of the Dolan structure, you are relying upon your memory as to just what you did some twelve, thirteen or fourteen years ago?

A. 420. It was worked out as stated.

X-Q. 421. Now the installation as described on Ex-
1021 hibit I-1 includes a Mercoid furnace control, or a notation to that effect, is that right?

A. 421. Right.

X-Q. 422. And the control was a special one in that a double contact mercury tube was employed?

A. 422. That control was available at that time with either a single circuit tube in the furnace control, or as a two-circuit tube. We used hundreds of those controls in 1926 and 1927 as is evidenced by the invoices, same being used for the limit control in connection with the Honeywell room thermostat, Series 20 and the D.S.S. Honeywell motor switch. It was the only control available at that time.

X-Q. 423. But first you used a Honeywell stack switch in place of one of these controls that are available of the Mercoid type, for controlling the fan in the Dolan installation?

A. 423. Will you please clarify the question? Are you referring to the control in the smoke pipe or in the furnace?

X-Q. 424. I am referring to the control in the smoke pipe.

A. 424. The control in the smoke pipe is a helix or coil construction, exposed to the products of combustion or temperature within the smoke pipe. Smoke pipe temperatures may run as high as 600 or 700 degrees Fahrenheit. There
was no other control available; in fact no Mercoid
1022 control could be used in that location; this is the only control available at that time that could be used in the smoke pipe to withstand that high temperature and serve that purpose.

X-Q. 425. Now I hand you Invoice, Mercoid Exhibit D-1,

and will ask you to examine it and tell me whether or not there was included in the invoice any Mercoid furnace control.

A. 425. This invoice represents the sale of a Williams Oil-O-Matic burner by an employe in the office—Ina Irvin. Her name appears on the invoice and she was given credit for the sale for that reason. This burner was sold during a campaign in the office. Employees canvassed the City of Bloomington. Miss Irvin knew nothing about control systems or burners, but did have an order blank for a steam, hot water or warm air installation. On that order blank was a choice of plain room thermostat or clock thermostat. This invoice represents a 1200 R.P.M. Oil-O-Matic burner with Honeywell controls for standard installation, and it is priced accordingly. The word "campaign" appears thereon, with credit of $50.00 given with order during that campaign. As usual, upon inspecting the installation, we found additional controls were necessary because the furnace was equipped with a booster fan. Those controls were installed and, if I recall, we were under obligation to install said controls. Whether they were charged for or not, the
1023 controls were installed, and they are not shown on this invoice. Controls for the Honeywell switch and safety, the spark and gas control, and the oil suction pump appear thereon.

X-Q. 426. Exhibit D-1 is a copy of an invoice, is it not?

A. 426. It is a copy of invoice No. 6658.

X-Q. 427. And would not any additional controls furnished on the job at the time of installation be included on the invoice even though no charge had been made to the purchaser?

A. 427. Not necessarily so. This installation was sold at a price of $816.00. We could, at that time, very well afford to add additional controls with no loss on the transaction.

X-Q. 428. But your company did not tolerate taking controls out of stock without some record being made?

A. 428. We tolerated most anything in those early days. Very few records were kept as to stock.

X-Q. 429. That is the best explanation you want to make?

A. 429. Well the local service was in charge of the service manager and the service manager (being myself) was very busy at that time in the office attempting to keep five thousand Oil-O-Matic burners in operation throughout the

country, and the local Installation and Service Department received very little attention. The orders were to
1024 keep the jobs running and to get them from stock. We had a tremendous amount of local installations to make during the Fall of 1926, and this is one of the campaign jobs. We had on hand over one hundred orders for local installations at that time.

X-Q. 430. Did you inspect all of these installations?

A. 430. No, sir.

X-Q. 431. Then as a matter of fact the Dolan installation, and particularly the Mercoid furnace control which you have referred to in the drawing, Exhibit I-1, you have no record whatsoever of that installation?

A. 431. Those records that have been in my office have all been destroyed.

X-Q. 432. And you have no invoice record?

A. 432. We may have—I don't know.

X-Q. 433. You recall that you identified the ledger sheet of the Dolan account and you found thereon an amount corresponding to invoice, Mercoid Exhibit D-1, as the only item sold to Dolan. Do you so recall?

A. 433. I don't remember the details of the ledger sheet.

X-Q. 434. Might that Mercoid furnace control as shown on October 2, 1940 drawing, Exhibit I-1, have been installed some time later than the original installation?

A. 434. No, for the reason that this particular type
1025 of control was the only control available for use in connection with a warm air furnace limit switch, with either the two-wire plain thermostat job or the three-wire Honeywell motor controls during 1926.

X-Q. 435. Are you now referring to the mercury tubes with the two sets of contacts in it as the only switch available?

A. 435. Yes, the two tubes in the control, one a two-circuit tube and one a single circuit tube.

X-Q. 436. I understood you to say this morning that a two-contact tube was added.

A. 436. I made that statement and I corrected it later. My first statement was that the tube in this control, at the bottom, was added; and I believe that I later stated that the evidence in the photograph showed the top tube was added. The control as shown in the photostat, Exhibit B-1, is not clear enough to determine whether the upper or the lower control was added to the original control. Mr. Louis

Lartz having altered this control and knowing its mechanism, can determine definitely what changes he made in this control when the same was installed.

X-Q. 437. I take it that with the Honeywell room thermostat and with the Honeywell D.S.S. motor switch, you would have to have a structure corresponding to the tube with the two contacts thereon, and I am referring to that part of the drawing entitled "Mercoid Furnace Control."

1026 A. 437. The two-circuit mercury tube was used on the Honeywell D.S.S. motor switch, Series 20 thermostat controls so as to provide a 3-circuit control by using the two-circuit tubes in the limit controls on warm air furnaces, steam boilers and hot water boilers.

X-Q. 438. And you would require a Mercoid furnace control with the two-contact type tubes even though you did not employ the single contact tube for controlling the limit switch?

A. 438. We always installed a limit switch on Williams Oil-O-Matic installations locally. At that time we purchased, as I recall it, two types, and perhaps three types, of Mercoid controls, the only difference being in the tube structure. We had on hand various Mercoid tubes. We changed the controls in our shop to conform with the various applications by removing one type of tube and inserting another.

X-A. 439. Then with each Minneapolis-Honeywell 3-wire thermostat and a Honeywell D.S.S. motor, you used as standard a Mercoid control?

A. 439. A Mercoid trombone control with 2-circuit tube on practically all installations, using Honeywell equipment.

X-Q. 440. And by the 2-circuit tube, you have reference to the upper tube shown in Mercoid Exhibit I-1?

1027 A. 440. Correct, but it would work equally as well if the location of the tubes were reversed, as shown on Mercoid Exhibit I-1, because both tubes move together on the bracket.

X-Q. 441. Now that you have told us that a Mercoid 2-contact tube was used with all Honeywell, Series 20 thermostats and Honeywell D.S.S. motors, I now hand you Mercoid Exhibit D-1 and ask you to point out, if you can, where the Mercoid control which is to be used with the Honeywell room thermostat appears upon the invoice, or point out on the invoice the particular control used in lieu of the Mercoid control appearing on Exhibit I-1.

A. 441. When the Bloomington campaign was put on, stenographers and all employees canvassed the town, and many of these employees would not be able to identify what type of heating plant was installed on the premises. In fact I doubt if any of them ever saw a heating plant. The installed price shown as $550.00 included—in fact the price was sufficient to cover the piping, valves, fire brick, high temperature cement, labor, moving of material and moving of rubbish, and so forth, and included any additional controls that might be needed, such as the furnace limit switch.

X-Q. 442. Well, if the Mercoid limit switch was
1028 standard as you have stated, and it was used in connection with each Honeywell room thermostat switch and Honeywell D.S.S. motor switch, then as I understand it, that you put it on the stenographers for absence of any reference to the Mercoid switch appearing on the invoice, Exhibit D-1?

A. 442. This invoice does not show a complete bill of material. For example, the fire brick, piping, square "D" or entrance switch, fuses, electric wiring not previously mentioned, and various other equipment and material does not appear on this invoice; the selling price of the burner and an additional charge of $21.00 for the thermostat, plus a special 3000 gallon tank, is all that appears on the invoice in the way of equipment. In order to complete this installation, all of the aforesaid material and additional controls were necessary, and were included in the price as shown of $550.00. The one charge for thermostat, referred to as $21.00, is the additional charge over and above a plain two-wire thermostat and a clock thermostat. These three items make a total of $316.00, which was the net charge to this customer for the complete installation, including the different controls that have been necessary to use.

X-Q. 443. You have no record by which you can positively fix the date when you saw the Dolan installation?

1029 A. 443. My reference would be to the ledger sheet showing the billing for the job, which I know was only done at the completion of the installation. That would be the only date that I could refer to as a reminder.

X-Q. 444. And of course you have not been at the Dolan residence until recently to check the installation?

A. 444. Not for a number of years; in fact I have not

had anything to do with local service for eight or ten years, so could not be definitely certain as to the date.

X-Q. 445. And any change in controls during that period you would know nothing about?

A. 445. No.

X-Q. 446. And the Minneapolis-Honeywell control, you know nothing about?

A. 446. I am very familiar with the Minneapolis-Honeywell control and the Honeywell controls. In fact I have used them.

X-Q. 447. I mean the Honeywell control now on the job?

A. 447. I am very familiar with the Minneapolis-Honeywell structure, which is exactly as the Honeywell originally installed at the time of installation as to stack safety control and functions in conjunction with the Honeywell D.S.S. motor switch. The original control—if this control was changed—was an exact duplicate of this control out-
1030 side of the cover plate, which could then only be marked "Honeywell Control" at the time of installation.

X-Q. 448. Do you know when or how the Minneapolis-Honeywell control came to be on the Dolan job?

A. 448. The cover, which is partly removed and upside down, with the name "Minneapolis-Honeywell" is an exact duplicate of the cover formerly marked "Honeywell Control," and these covers are interchangeable on the Honeywell and the Minneapolis-Honeywell controls.

X-Q. 449. Now turning to the Evangelical Church, tell us exactly what was installed in the summer of 1925, and I refer you to Mercoid Exhibit C-1.

A. 449. This Exhibit C-1, dated 6/18/25, is a similar billing as compared with the Ned Dolan sale. It shows a deposit of $50.00, marked with a pen for some reason. It also shows the name "Parkmeier," who evidently was the salesman and who accepted this order for the installation of an Oil-O-Matic burner with 220 gallon tank and plain thermostat. This was written up by the Order Department after the Sales Department received the local order from whoever sold the burner and acknowledged the order, a copy of which came to my desk. I recall that following this order I inspected the furnace in which the burner was to be installed at the Evangelical Freidens Church.

X-Q. 450. And what installation did you find when
1031 you made the inspection?

A. 450. I found an Oil-O-Matic burner on the prem-

ises. Pardon me, at the time I made the inspection in 1925, following the receipt of this order, I found a large industrial type of furnace with booster fan equipped with 3 horse power motor. This order being for a standard warm air installation, it did not of course apply to a large industrial furnace, for the following reasons: The burner did not have sufficient capacity to fire this furnace to its maximum rating. An Oil-O-Matic, Model "G," 1800 R.P.M. burner was to be installed to replace the 1200 R.P.M., which practically doubled the capacity. The church people wanted two thermostats instead of one for the reason that they desired to hold meetings in the basement during the week without heating the church; and to control the temperature in the basement this required an order for an additional thermostat. I explained to the parties in charge at the Church what had occurred and that various controls would be necessary, such as an additional thermostat, a heavy duty relay, one additional Mercoid Federal Gauge warm air control with reverse tube to act as a pilot through the relay to operate the large 3 horse power motor connected to the booster fan. The furnace limit control necessary on this job was not mentioned at that time as it was already incorporated in the price
1032 of $475.00 for the standard installation. They agreed to purchase these controls and the relay, and we installed the larger capacity burner, as I recall it, at no additional expense. The additional controls, I think, were billed on a separate invoice for this installation.

X-Q. 451. You have just testified that with the price of $475.00 appearing on invoice, Mercoid Exhibit C-1, the limit control was already included.

A. 451. Not only the limit control but the fire bricks, which would amount close to $50.00; high temperature cement, considerable electric wiring, entrance switch, labor, piping, valves—these were all incorporated in this $475.00, as well as the limit switch; and we did not itemize these various things on the invoice.

X-Q. 452. Then I take it, looking at Exhibit C-1, that the installation originally included one thermostat and the Mercoid limit control, but did not include the Mercoid furnace control, which has been referred to as a fan switch?

A. 452. This Exhibit C-1 does not represent all the necessary items to make an Oil-O-Matic installation. This simply represents that an order has been received for the installation of an Oil-O-Matic burner. Our local sales con-

tract did not obligate us to make this installation in accordance with this local order as mentioned thereon.

1032 It was an agreement signed by the purchaser that we may return their deposit and cancel the order if, upon inspection of their heating plant, we preferred not to make the installation.

X-Q. 453. Mr. Price, what I hand you as Mercoid Exhibit C-1 represents a customer's invoice, and your company did not send out invoices until the installation was made, did it?

A. 453. Yes, upon receipt of the order this was mailed to the customer, and I received a yellow copy of the invoice. Right or wrong, that is what was done.

X-Q. 454. The amount of $322.00 which appears upon invoice, Exhibit C-1, represented the oil burner, did it not?

A. 454. Not being in the Sales Department I am not familiar with the sale price of the burner at that time. I did not keep in my files prices of equipment, and I refuse to function as a salesman when in the capacity of a service manager.

X-Q. 455. Speaking then in the function of a service manager, will you point out on Mercoid Exhibit H-1, which is what you say was included in the Church installation as a result of invoice, Exhibit C-1, giving the particular items which were included in the installation as you saw it?

A. 455. The installation, when completed, consisted

1034 of a Model "G," 1800 R.P.M. burner. The burner was equipped with spark and gas control, switches and safety, two Mercoid high voltage thermostats, one 220 gallon tank, one heavy duty Allen-Bradley starting relay switch, one Mercoid Federal Gauge Company trombone type furnace limit control and another control exactly the same with tube reversed to act as a pilot to start the 3 horse power motor connected with the large booster fan with belt drive, which above mentioned controls constituted the most important controls used in the system. I assume you are referring to the control system.

X-Q. 456. No, you have not answered my question. I am asking you to tell me what controls you saw installed at the Church which were included on the invoice of June 18, 1925, which installation you stated you saw shortly thereafter.

A. 456. Well, I—

By Mr. Moore: The witness has been on the stand now for 1½ hours—from 8:00 o'clock until 9:30. He is looking

pale and very tired, and if he feels he is too tired to answer this question tonight, I move that we adjourn and continue this cross-examination tomorrow morning.

By Mr. Freeman: Let us adjourn.

1035 By Mr. Moore: Adjourned until Thursday morning, at 9:30 A. M.

By Mr. Moore: Met pursuant to adjournment Thursday; October 10, 1940, at 9:30 A. M.

Present: As before.

By Mr. Freeman: Cross-examination resumed.

By Mr. Freeman:

X Q. 457. Do you have any invoices in connection with the garage that you referred to, and particularly Mercoid Exhibit F-1?

A. 457. By "invoices," just what do you refer to?

X Q. 458. Any records in connection with an installation.

A. 458. We have many invoices showing numerous installations.

X Q. 459. I am talking about the special installation or at least the special drawing of the garage that you referred to yesterday as having a garage portion, a receiving room or waiting room, all as shown on Exhibit F-1.

A. 459. I do not understand just what you desire in the way of an invoice.

X Q. 460. Well, Exhibit F-1 is a special drawing?

A. 460. Right—using various controls to accomplish a desired result.

X Q. 461. You referred to Exhibit F-1 in connec-
1036 tion with a garage.

A. 461. That is right.

X Q. 462. What garage?

A. 462. A garage—no garage in particular.

By Mr. Freeman: Cross-examination closed.

By Mr. Moore: Re-direct examination.

By Mr. Moore:

R D. Q. 463. In answer to the last question you said "no garage in particular." I believe you said something about a floor-plan of a garage?

A. 463. That is correct.

R-D. Q. 464. And did you receive a floor plan of a garage?

A. 464. I did.

R-D. Q. 465. From someone who wanted an oil burner put into it?

A. 465. This floor plan was brought in by a dealer with two men accompanying him. When I made the statement, "no garage in particular," I had in mind this system as applying to all garages of similar construction. This system or special application was filed and used by me thereafter on all or any garage buildings of similar construction.

R-D. Q. 466. Then this wiring diagram was gotten up to answer the needs of the dealer who brought the two men in with this floor plan?

1037 A. 466. That is right.

R-D. Q. 467. You were asked if you could produce any invoices, and my understanding of that question is can you produce any invoice for this particular installation in this garage building, the floor plan of which was brought in to you by these two men who accompanied the dealer?

A. 467. The only invoices that I would be familiar with or could produce or connect up with any installation, would be invoices for local installations in Bloomington.

R-D. Q. 468. But you have no invoices that you have been able to find relating to this particular job, is that correct?

A. 468. That would be impossible to look for such an invoice for the reason that our dealers ordered, or had on order, in 1927, quantities of burners, usually twenty-five, so as to obtain the maximum discount. They also ordered various controls for future orders, and if the installation was made where the Allen-Bradley relay was used, those controls were usually ordered from Allen-Bradley Company, so we would have no invoice on this particular burner showing the various controls used therein.

R-D. Q. 469. This dealer who brought the two men in to you, was he a dealer in Bloomington?

A. 469. No.

R-D. Q. 470. Do you recollect now who that dealer was in 1927?

1038 A. 470. I do not.

R-D. Q. 471. Have you any knowledge or recollection of where this garage was located?

A. 471. I don't know definitely where this garage was

located. I do know that it was on the Springfield road, near some town between here and Springfield, Illinois.

R-D. Q. 472. I am referring now to this installation in the Dolan home and the wiring diagram marked Mercoid Exhibit I-1. I believe you said on cross-examination that the thermostat was a Honeywell thermostat and that it was a standard construction for the Honeywell D.S.S. motor and the Mercoid furnace control, is that correct?

A. 472. The drawing refers to a Honeywell room thermostat. However, the Minneapolis-Honeywell, Series 20, room thermostats were used in this circuit and would operate equally as well.

R-D. Q. 473. I show you a page from the Installation and Service Manual, Mercoid Exhibit E-2, which is numbered Sheet A-174, and ask if you know what that is?

A. 473. This is a control system for use in connection with our burner as manufactured in 1926.

R-D. Q. 474. Will you please state what the title across the top of the page is?

A. 474. The title is, "Model 'G' Honeywell."

1039 R-D. Q. 475. And there is a description following that, is there not?

A. 475. Yes.

R-D. Q. 476. Will you please read that description into the record?

A. 476. "Oil-O-Matic Burner Installation using Honeywell control switch, Honeywell thermostat, Honeywell stack switch and Federal Mercoid steam control with two circuit mercury tube. Connect all terminals according to color, as shown, regardless of position. All controls shown are face view. On Honeywell equipment B and W terminals are used for off position and R and W terminals are used for on position."

R-D. Q. 477. I notice that at the bottom of this sheet, which is similar to the other drawings in this book, following the notation "Drawn by" the initials "H.V.G." Whose initials are they?

A. 477. Herschel V. Gibson.

R-D. Q. 478. And on the opposite side the date appears, "Feb. 9. 26."

A. 478. Correct.

R-D. Q. 479. Do you know in whose handwriting that is?

A. 479. This was drawn by Herschel V. Gibson, under my direction, and signed by Herschel V. Gibson.

R-D. Q. 480. Following the notation "Approved by"

appear the initials "O.H.P." Whose initials are they?

1040 A. 480. That is my signature.

R-D. Q. 481. When did you place them on there?

A. 481. February 9, 1926.

R-D. Q. 482. You placed that on the original tracing after Mr. Gibson made the drawing?

A. 482. And after I checked and approved it.

R-D. Q. 483. I will ask you what this figure is which is shown as a 2-circuit mercury tube switch?

A. 483. This is a Mercoid steam, low pressure control equipped with a two-circuit three-wire tube used in the low voltage circuit of a 3-wire installation.

R-D. Q. 484. Do you see anything that corresponds to that on Mercoid Exhibit I-1?

A. 484. I see the duplicate of the two-circuit tube, which is identical in construction with the one used in the steam boiler control.

R-D. Q. 485. This heating system that is shown on Sheet A-174, what type of heating system is it?

A. 485. Steam.

R-D. Q. 486. And the heating system in the Dolan residence is what type?

A. 486. Warm air.

R-D. Q. 487. Then the Mercoid steam control shown on Sheet A-174, is that the control that is shown in the Mercoid Catalog, Exhibit E-1?

1041 A. 487. It is, on page 2, Figure 31, with the exception that in this bulletin it shows the single circuit tube, held in place with two clamps. To convert this control, all that was necessary was to remove the tube and to insert the four wires to circuit, with the two inside wires connected together, which gave us a control for use with series 20, 3-wire controls.

R-D. Q. 488. Is such a tube illustrated in this Mercoid bulletin, Mercoid Exhibit E-1?

A. 488. Yes, on page 4, Figure 2.

R-D. Q. 489. I believe you testified that in the photograph of the Dolan residence, Mercoid Exhibit B-1, a stack safety was shown, is that correct?

A. 489. Yes.

R-D. Q. 490. And do you find a stack safety on Sheet A-174?

A. 490. I do.

R-D. Q. 491. What type of stack safety is it?

A. 491. This is a Honeywell stack switch, high and low voltage, with two mercury tubes.

R-D. Q. 492. Can you tell from the photograph whether there are two mercury tubes in the stack safety switch shown on Mercoid Exhibit B-1?

A. 492. Yes.

R-D. Q. 493. What type of room thermostat did you say was employed in the Dolan residence?

1042 A. 493. A low voltage, series 20.

R-D. Q. 494. Made by whom?

A. 494. Either Honeywell or Minneapolis-Honeywell; I am not certain which.

R-D. Q. 495. And what kind of a thermostat is shown on page A-174?

A. 495. A Honeywell thermostat.

R-D. Q. 496. Do you know approximately how many of these Honeywell room thermostats and stack safeties were used by the Oil-O-Matic?

A. 496. Many thousands were used. We had in stock something like one hundred thousand clock thermostats when we changed to later type controls.

R-D. Q. 497. Were they Honeywell or Minneapolis?

A. 497. Both.

R-D. Q 498. And do you know when the Minneapolis and Honeywell Companies merged and became the Minneapolis-Honeywell Regulator Company?

A. 498. I do not. I heard it referred to in the testimony last evening except as to the date.

R-D. Q. 499. I show you a catalog of the Minneapolis-Honeywell Regulator Company and call your attention to a date which appears upon the last page. Can you tell me what that notation is?

A. 499. The notation reads: "P. Inc. SA128 5-28 5M."

1043 R-D. Q. 500. Did you make any search through your records to find the earliest Minneapolis-Honeywell catalog that you have?

A. 500. I did.

R-D. Q. 501. And is this the earliest one that you could find?

A. 501. Yes.

R-D. Q. 502. And you found this where?

A. 502. In my files at the office.

R-D. Q. 503. I call your attention to page 26 and ask if you know what that illustrates?

A. 503. This illustrates the Minneapolis-Honeywell combustion safety control with cover in place, and which does not show the internal mechanism. At the top I note two outlets, one of which was used in our installation for connecting the high voltage line to the large 10 ampere tube on the bottom of the control bracket. On the upper right is a small outlet provided for a low voltage wire connection, which wires connected to the small 3 ampere tube located on the top of the bracket.

R-D. Q. 504. Have you had any actual experience with this instrument which you have just described?

A. 504. A great amount of experience.

R-D. Q. 505. Do you know approximately how many of the Minneapolis-Honeywell Type B combustion safety controls the Oil-O-Matic has used?

1044 A. 505. Not less than six thousand and possibly a considerable greater number.

R-D. Q. 506. I show you here a catalog of the Honeywell Heating Specialties Company, Wabash, Indiana, 1925-1926, and call your attention to an illustration on page 18 and ask if you know what that is?

A. 506. This is the Honeywell combustion safety control with cover in place and with two outlets at the bottom showing the provision for connecting the high voltage circuit to a high voltage mercury tube located within the control at the bottom of the bracket. The top right connection provides for electrical connection of the low voltage wires to a 3 ampere tube located within control and at the top of the bracket. This control, however, was purchased from the Honeywell in the early days with only the 10 ampere tube, in many cases for use as a 2-wire, high voltage shunt switch but being wired in parallel with the safety heater in the Mercoid control box, used as standard equipment on all Model "G" burners.

R-D. Q. 507. Were you testifying as to the parts shown on the illustration on page 18 of this Honeywell catalog, 1925, or from your knowledge of the internal arrangement thereof?

A. 507. Both.

R-D. Q. 508. I call your attention to the Minneapo-
1045 lis-Honeywell catalog on page 26 and ask you what is the title that appears across the top?

A. 508. "Type B Combustion Safety Control."

R-D. Q. 509. Do you know whether or not from your ex-

perience with these types of controls there is any difference in the internal arrangement?

A. 509. None whatever—they are identical.

R-D. Q. 510. And how about the casing that encloses the internal arrangement?

A. 510. The casings are identical—exactly alike.

R-D. Q. 511. And how about the cover plates?

A. 511. The cover plates are identical with the exception of the lettering on these cover plates.

R-D. Q. 512. Do you know whether or not those cover plates are interchangeable in these two instruments?

A. 512. They are interchangeable.

By Mr. Moore: I introduce a photostat of page A-174 from the Installation and Service Manual, Mercoid Exhibit E-2, as part of MERCOID EXHIBIT E-2.

(The photostat of page A-174 was accordingly marked Mercoid Exhibit E-2, and made a part of this deposition.)

By Mr. Moore:

R-D. Q. 513. I will ask you to inspect The Honey-
1046 well Heating catalog, Mercoid Exhibit J-2, and see if you can find therein a room thermostat such as you have referred to in your testimony as being in the Dolan residence?

A. 513. No.

R-D. Q. 514. I show you here a Minneapolis Heat Regulator catalog marked at the bottom "1885—1925" and ask if you can find therein a Minneapolis room thermostat such as you have referred to in the Dolan home?

A. 514. Yes, on page 18 and on the title page.

By Mr. Moore: I will offer in evidence the title page, the last page and page 26 of the Minneapolis-Honeywell catalog as MERCOID EXHIBIT J-1.

(The title page, the last page and page 26 of the Minneapolis-Honeywell catalog was accordingly marked Mercoid Exhibit J-1, and made a part of this deposition.

By Mr. Moore: I will offer in evidence photostats of the first inside page of the Honeywell Specialties Company catalog, 1925-1926, and page 18 as MERCOID EXHIBIT J-2.

(The photostats referred to were accordingly marked Mercoid Exhibit J-2, and made a part of this deposition.)

1047 By Mr. Moore: I will offer in evidence the photostats of the outer cover, the title page and page 18 of

this Minneapolis Heat Regulator catalog as MERCOID EXHIBIT J-3.

(The photostats of the pages referred were accordingly marked Mercoid Exhibit J-3, and made a part of this deposition.)

By Mr. Moore:

R-D. Q. 515. I show you another catalog of the Honeywell Heating Specialties Company which bears no date, and ask you if you find therein any illustrations of the room thermostat or of the stack control that you have heretofore referred to in connection with the Dolan installation?

A. 515. No.

R-D. Q. 516. Do you find in this catalog any wiring diagrams which would connect up a furnace fan with a warm air furnace control such as shown in the Dolan installation?

A. 516. I do, on page 22, lower view. This shows a full automatic control system automatically regulating the furnace temperature of a coal-fired furnace and equipped with a booster fan, furnace control mounted in the bonnet of the furnace and electric motor, from which 3 low voltage wires lead to the room thermostat as indicated, and two high voltage wires lead to the house lighting circuit. This
1048 motor, as I recall, is the type of motor and of similar construction, with certain parts interchangeable, that we used in the system shown as a control system on sheet No. A-174 of Mercoid Exhibit E-2.

R-D. Q. 517. Which of these views on page 22 were you referring to when you testified?

A. 517. The lower, with the motor control.

R-D. Q. 518. And there are certain instruments shown on this page with titles set opposite them. Will you please indicate same and the title given them on this drawing?

A. 518. The booster fan is referred to as "Aerofan" and was of Honeywell manufacture. The furnace fan control is referred to as "Furnacestat," with arrow pointing to the instrument and its location, and with high voltage lines connected thereto, referred to as "Wires to house lighting circuit." The high voltage circuit continues from the "Furnacestat" and the "Aerofan," and there is also an additional wiring connection from the Aerofan to damper of switch. The electric motor is referred to as "Electric motor," with additional reference being made as "Wires to house lighting circuit." At the top of this par-

ticular motor three wires are shown with arrow pointing to same and reading "Wires to thermostat." Between the electric motor and the Furnacestal is incorporated a
1049 damper switch. At the bottom of the illustration is the title "Automatic control."

1050 By Mr. Moore:

Q. 1. Please state your name.
A. 1. Louis H. Lartz.
Q. 2. Age.
A. 2. 51.
Q. 3. Residence.
A. 3. Bloomington, Illinois.
Q. 4. Occupation.
A. 4. Electrician.
Q. 5. Are you employed now as an electrician?
A. 5. Yes, with the Williams Oil-O-Matic Heating Corporation.
Q. 6. How long have you been employed with the Williams Oil-O-Matic Heating Corporation as an electrician?
A. 6. Since 1925.
1051 Q. 7. When you first became employed by the Williams Oil-O-Matic Heating Corporation, in what department were you located?
A. 7. In the Electrical Department.
Q. 8. And what were your duties there?
A. 8. To do electrical work in the shop or in the Service Department.
Q. 9. Did you work in the Service Department then?
A. 9. Yes, sir.
Q. 10. Who was in charge of the Service Department?
A. 10. Mr. O. H. Price.
Q. 11. And is Mr. Price still in the employ of the company?
A. 11. He is.
Q. 12. What is his position now?
A. 12. He is in charge of all outside service, outside of the City of Bloomington.
Q. 13. And who has charge of the service in the city of Bloomington?
A. 13. A fellow by the name of Rasmussen.
Q. 14. Do you know his first name?
A. 14. I don't know his first name.
Q. 15. Do you work with Mr. Rasmussen now?
A. 15. Yes.

Q. 16. Who makes the actual installations of Oil-O-Matic oil burners in Bloomington?

1052 A. 16. The Service Department does the brick work, *but I do all the electrical work*—I and my assistant.

Q. 17. How long have you been doing that?

A. 17. Since the Oil-O-Matic started.

Q. 18. Then am I to understand that you have personally done all of the electrical work in connection with the Oil-O-Matic oil burners since you have been employed by the Williams Oil-O-Matic Heating Corporation?

A. 18. Right.

Q. 19. In the early days did you make the installations yourself?

A. 19. Yes, sir.

Q. 20. And do you make the installations yourself now?

A. 20. No, I have two assistants, but I am on every job.

Q. 21. Do you inspect each installation after it has been hooked up?

A. 21. Yes.

Q. 22. And have you always done that?

A. 22. Yes, sir.

Q. 23. I show you here page A-67 of the Installation and Service Manual, Mercoid Exhibit E-2, and ask you if you know what that is?

A. 23. Yes, that is a typical fan installation—booster fan installation—to blow up heat out of a hot air furnace.

1053 Q. 24. Did you have anything to do with the making of that drawing, do you know?

A. 24. Well, I cannot say definitely, but I assisted with most all prints in the earlier years.

Q. 25. Can you give me a brief description of what that picture illustrates?

A. 25. It illustrates a hot air furnace with a blower fan induced in the cold air duct, which is operated by a motor controlled through a relay, which is controlled by a Mercoid furnace control and which is controlled by expansion and contraction of gas in the tube of this instrument.

Q. 26. I believe that the furnace control you have referred to is marked "Furnace Control (Special)," is it not?

A. 26. That is right.

Q. 27. Why was it marked "special," do you know?

A. 27. I presume at the time this print was made we

had to reverse the tubes in the standard furnace control.

Q. 28. What was the purpose of reversing the tube?

A. 28. Well, in the standard furnace controls the tube tipped in the "off" position with excessive heat, whereas in the fan control the tube tipped in the "on" position in moderate temperature.

Q. 29. Who was the manufacturer of the controls used on the Oil-O-Matic oil burner in the early days?

1054 A. 29. Federal Gauge, I believe, or the Mercoid Company.

Q. 30. Did you use any other equipment than that made by the Federal Gauge or Mercoid?

A. 30. Yes.

Q. 31. You have a distinct recollection of using the Mercoid control?

A. 31. Oh, yes.

Q. 32. I show you a Mercoid Exhibit E-1 and ask if there is illustrated thereon any instrument which you have referred to in connection with this furnace control special?

A. 32. Yes, on the last page, there is a Figure 50.

Q. 33. That Figure 50 has an end which looks something like a hairpin. Do you know any particular name for that part of the instrument?

A. 33. Yes, we used to call this the trombone part of the instrument.

Q. 34. And what is this particular instrument, Figure 50, used for?

A. 34. As a high limit switch.

Q. 35. Then when you wanted to use it as a fan switch I believe you reversed the tube, is that correct?

A. 35. Right.

Q. 36. Do you find the trombone as you have referred to on this page A-67 anywhere?

A. 36. Yes.

1055 Q. 57. Where is it shown?

A. 57. The instrument is mounted apparently on a brick wall and the trombone is inserted in the heating chamber of the hot air furnace.

Q. 58. Now I notice there is a relay switch shown on this page. What is the purpose of this relay switch?

A. 58. The purpose of the relay switch in this particular instance is to relieve the control of handling heavy current.

Q. 59. Why was heavy current handled?

A. 59. On account of the large size motor.

Q. 60. I show you Sheet A-150 of Mercoid Exhibit E-2 and ask if you know what that represents?

A. 60. It represents a standard hook-up of the Model "G" burner with Mercoid controls throughout.

Q. 61. What Mercoid controls are shown on that drawing? Identify them by the legend appearing on the drawing.

A. 61. It is a furnace limit control, Figure 50.

Q. 62. How is it indicated on the drawing?

A. 62. As a furnace control.

Q. 63. What else does it show?

A. 63. It shows a room thermostat, Figure 21.

By Mr. Moore: Let the record show that the witness is referring to Figure 21 illustrated on Mercoid Exhibit E-1.

1056 Q. 64. Anything else?

A. 64. We have a stack safety.

Q. 65. Anything else?

A. 65. And a control box in the burner.

Q. 66. Does a wiring diagram appear on that drawing?

A. 66. Yes.

Q. 67. And can you trace the circuit from the meter through the various controls?

A. 67. Yes.

Q. 68. Please do so.

A. 68. The current starts from the "hot" side of the line and goes through the furnace control, out of the furnace control to the room thermostat and from the room thermostat into the safety circuit and then into the motor; in other words, a series hook-up.

Q. 69. When does the furnace control operate?

A. 69. When the temperature is excessive in the bonnet of the furnace.

Q. 70. What does it do?

A. 70. It opens up the circuit and stops the burner.

Q. 71. Do you use the same control when you have a heating system employing steam or hot water?

A. 71. No.

Q. 72. What do you use in that case?

1057 A. 72. We used a Figure 31, or 36 or 37.

By Mr. Moore: Let the record show that the witness is referring to page 2 of Mercoid Exhibit E-1.

By Mr. Moore:

Q. 73. What did you say the purpose of these controls was?

A. 73. To shut down the burner in case of excessive steam, hot air or hot water.

Q. 74. What controls the normal operation of an oil burner?

A. 74. A thermostat.

Q. 75. What thermostat are you referring to?

A. 75. Mercoid, Figure 21.

Q. 76. Where is it located?

A. 76. Located in an upstairs room.

Q. 77. Then am I to understand that the normal operation of an oil burner is controlled by the limit control as well as by the room thermostat?

A. 77. No, the thermostat operates 90 per cent of the time controlling the burner.

Q. 78. Do you know why this Installation and Service Manual, Mercoid Exhibit E-2, was gotten up?

A. 78. Yes, to help the average installation man away from Bloomington.

Q. 79. On what kind of installations?

A. 79. Standard installations.

1058 Q. 83. I show you another diagram marked "A-198," Mercoid Exhibit F-1, and ask you if you know anything about this?

A. 83. This was a special hook-up drawn up for a dealer south of Bloomington. I don't know who the dealer was but it was a special hook-up, however.

Q. 84. Did you have anything to do with that special hook-up?

A. 84. I probably did.

Q. 85. Was that a standard job?

A. 85. No—very special.

Q. 86. Do you know what circuit is established in this Mercoid Exhibit F-1 when a thermostat in one of the small rooms indicated at one corner is closed?

A. 86. The thermostat being closed, in turn closes

1059 the relay, which in turn allows current to flow from the meter to the oil burner through the series of controls.

Q. 87. I show you here Mercoid Exhibit F-2 and ask you if the circuit indicated in red thereon is the circuit you have just referred to?

A. 87. That is right.

Q. 88. I notice in the room marked "Heating plant" on this drawing there is a notation "Fan," and lines with arrows leading therefrom. Can you describe briefly what

happens after the oil burner has been placed in operation for a short time?

A. 88. Well, after the oil burner has been placed in operation the current is flowing toward one fan through a Mercoid furnace control.

Q. 89. What type of Mercoid furnace control are you referring to now?

A. 89. This is a control for controlling the fan operation. It operates at 140 degrees.

Q. 90. I show you Mercoid Exhibit F-3 and ask you what the circuit shown in red thereon represents?

A. 90. Shown in red?

Q. 91. No, shown in blue.

A. 91. It represents the fan circuit. After the relay has closed the current flows from the relay to the fan control and fan.

1060 Q. 92. How long does that fan operate?

A. 92. Whenever the temperature is up to what the instrument is calibrated at, or the thermostat is satisfied.

Q. 93. What instrument did you refer to as opposite the room thermostat?

A. 93. The fan control.

Q. 94. And what do you mean by the statement you made in regard to the fan control because I asked you how long the fan would operate?

A. 94. The fan control is an instrument put into the circuit to prevent the fan from operating until the normal temperature is reached, which is controlled by the thermostat.

Q. 95. Then am I to understand you that the furnace fan control closes when the temperature in the furnace has reached the desired degree, and will continue to operate until the room thermostat opens the circuit?

A. 95. Right.

Q. 96. Now is there any limit control such as you have referred to shown on Mercoid Exhibit F-1?

A. 96. Yes, in series with the burner.

Q. 97. Now what happens when the limit control breaks its circuit?

A. 97. It stops the oil burner.

Q. 98. What happens to the fan?

A. 98. Continues to operate.

1061 A. 99. I show you Mercoid Exhibit F-4 and ask

you if that is the circuit that remains when the limit control has opened the circuit to the burner?

A. 99. That is right.

Q. 100. What is the circuit shown in red?

A. 100. The circuit shown in red is the power circuit from the meter to the relay to the thermostat.

Q. 101. And what is the circuit shown in blue?

A. 101. It is the circuit from the relay through the control to the fan.

Q. 102. I show you here a drawing marked "JA-258," Mercoid Exhibit G-1, and ask you if you know what that is?

A. 102. That is a special multiple installation for a boiler system. Whether with steam or hot water, I don't know.

Q. 103. Did you have anything to do with the getting up of that drawing, do you recall?

A. 103. I probably did; it was a special job I remember.

Q. 104. What are the circles at the bottom marked with the numeral "1"?

A. 104. Representing oil burners.

Q. 105. And the smaller circles at the bottom marked with the numeral "2"?

A. 105. Boiler control.

1062 Q. 106. Is that the boiler control that you have heretofore referred to in your testimony?

A. 106. Yes.

Q. 107. And what is the instrument indicated by the number "3" on the drawing?

A. 107. That is a Mercoid 2-tube thermostat.

Q. 108. Is that a standard Mercoid construction?

A. 108. I imagine you would have to order it special.

Q. 109. Did you ever handle any of these two-tube Mercoid thermostats?

A. 109. Yes, sir.

Q. 110. What is the small circle indicated by the numeral "4" on the drawing?

A. 110. This is a Mercoid hot water control.

Q. 111. Anything else on the legend there?

A. 111. It is a back angle stem installed in the steam main.

Q. 112. And does that give you any idea as to the kind of heating system this is?

A. 112. I would say hot water.

Q. 113. Are you familiar with any Mercoid hot water controls?

A. 113. Yes.

Q. 114. Are any Mercoid hot water controls illustrated on Mercoid Exhibit E-1?

A. 114. Yes, Figure 36 and Figure 37.

1063 Q. 115. What is the Figure 37?

A. 115. A back angle stem temperature tube.

Q. 116. And what are these squares at the top of the drawing marked with the numeral "5"?

A. 116. Fan motors or unit heaters.

Q. 117. Does the numeral "5" indicate the motor or the heater, or both?

A. 117. I imagine both.

Q. 118. What is a unit heater?

A. 118. Well, it consists of an electric fan and a motor and a radiator.

Q. 119. What are the squares indicated by the numeral "6" on the drawing?

A. 119. Relay of correct size for load.

Q. 120. Can you state what circuit is established when the room thermostat calls for heat?

A. 120. Yes, when the room thermostat calls for heat it energizes two relays, one controlling the oil burner and the other relay controlling the fan circuit.

Q. 121. I show you a drawing marked Mercoid Exhibit G-3 and ask you if the circuit indicated in red thereon is the circuit you have just referred to?

A. 121. Yes.

Q. 122. What happens after the burner has been

1064 operating for a short time?

A. 122. It closes the number "4" Mercoid hot water control installed in the steam main and then turns on the fans.

Q. 123. I show you a drawing marked Mercoid Exhibit G-4 and ask you if the circuit shown in blue thereon is the one you have just referred to?

A. 123. That is right.

Q. 124. What happens if the room thermostat is satisfied while the fan motors are running?

A. 124. They stop.

Q. 125. Does anything else stop?

A. 125. The burner.

Q. 126. I notice there are two tubes in the thermostat. What are they used for?

A. 126. One is to control the circuit to the burner and the other controls the circuit to the fans.

Q. 127. Now in the event that the burner is running and the fans are running and the room thermostat remains closed, but the temperature in the boiler becomes excessive, what happens?

A. 127. The control on the boiler opens up and stops the burner.

Q. 128. What happens to the fans?

A. 128. The fans continue to operate.

1065 Q. 129. I show you a drawing marked Mercoid Exhibit G-5 and ask you if that indicates the circuit in line you have just referred to?

A. 129. Yes, sir.

Q. 130. Have you made any installations such as shown on A-67 of Mercoid Exhibit E-2 in Bloomington?

A. 130. Yes.

Q. 131. Have you made any installations in Bloomington in accordance with drawing A-150 of Mercoid Exhibit E-2?

A. 131. Yes.

Q. 132. Have you recently inspected any residences or buildings in Bloomington that employed either of these hook-ups?

A. 132. Yes.

Q. 133. How long ago did you do that?

A. 133. A week ago.

Q. 134. Is that the only time?

A. 134. And yesterday, and about a month before that.

Q. 135. Who accompanied you the first time?

A. 135. Mr. Price and Mr. Moore, and I believe at a later date a photographer accompanied us.

Q. 136. I am referring to the time you spoke of about a month ago.

A. 136. Mr. Price, myself and Mr. McCabe, I think.

1066 Q. 137. You said that you were accompanied by Mr. Price, Mr. Moore and a photographer. Where did you find this installation you have referred to?

A. 137. One at the Evangelical Church, corner of Lee and Front Streets, and another at the Ned Dolan residence at Country Club Place.

Q. 138. Were both of these installations made in accordance with page A-67 and page A-150 of Mercoid Exhibit E-2?

A. 138. Yes.

Q. 139. Exactly as there shown on those two drawings?

A. 139. Yes.

Q. 140. Employing the same instruments exactly as shown on those drawings?

A. 140. The Dolan did not.

Q. 141. And what did you find in the Evangelical Church?

A. 141. A standard burner hook-up and a standard fan hook-up.

Q. 142. I show you here four photographs marked Mercoid Exhibits A-1, A-2, A-3 and A-4, and ask you if you recognize them?

A. 142. Yes, sir.

Q. 143. What do they represent?

A. 143. A standard burner and fan installation.

Q. 144. And where were these pictures taken, if you know?

A. 144. At the Evangelical Church.

Q. 145. When?

1067 A. 145. About a week ago.

Q. 146. And who was present at the time?

A. 146. The photographer, Mr. Price, Mr. Moore and myself.

Q. 147. I believe that you demonstrated last evening, on the premises, the operation of the controls shown on these photographs?

A. 147. I did.

By Mr. Moore: It is agreed by counsel for both parties that the testimony taken at the Evangelical Church in connection with Mr. Louis Lartz be inserted at this point.

By Mr. Moore: The Witness Lartz was asked the following questions and he gave the following answers in the furnace room of the Evangelical Church:

By Mr. Moore:

Q. 148. I call your attention to the door in the wall above the fan blower, and ask you where that door opens into?

A. 148. It opens into the room of the hot air chamber.

Q. 149. I call your attention to two instruments mounted on this door and ask you if you know what they are?

A. 149. Yes, sir, one is a furnace control or limit control for the oil burner, and the other is a fan control.

Q. 150. Which is the fan control?

1068 A. 150. The top one is the fan control.

Q. 151. Can you see the name plate on the top control so you can give me the type?

A. 151. Yes, I can.

Q. 152. Tell us what it is.

A. 152. It is a furnace control, Type M-51, Serial No. 9573-M.

Q. 153. What is the name on the casing in front?

A. 153. This is a Mercoid switch.

Q. 154. Who put that in there?

A. 154. I did.

Q. 155. What is the control below?

A. 155. A furnace limit switch—the old style bracket switch.

Q. 156. Well, the trombone is mounted on the door, is it not?

A. 156. That is right.

Q. 157. And who put the trombone on there?

A. 157. I did.

Q. 158. And where does the tube leading from one end of the trombone terminate?

A. 158. It leads to the wall, to the right of the door.

Q. 159. And in what does it terminate?

A. 159. Into the Mercoid switch.

Q. 160. And what is the identification on that switch, if you can see?

1069 A. 160. Hand Reset, Serial No. 68381.

Q. 161. What kind of a switch is this?

A. 161. A high limit switch for the oil burner.

Q. 162. How is it mounted on the wall?

A. 162. It is screwed to a board.

Q. 163. What supports the switch that is screwed to the board?

A. 163. A regulation bracket.

Q. 164. How many screw holes does the regulation bracket have?

A. 164. Two.

Q. 165. How is the trombone secured on the door of the furnace?

A. 165. By two screws—a slot cut in the cast iron door.

Q. 166. And where are the screws?

A. 166. Divided on the half.

Q. 167. I believe you stated that you placed the M-51 control on that door, did you not?

A. 167. Yes, I did.

Q. 168. Was there a control on there before that one was placed there?

A. 168. Yes, sir.

Q. 169. How was it placed on there originally?

A. 169. A trombone control, and I reversed the tube to make a fan control out of it.

1070 Q. 170. Where was the casing of this second Mercoid switch mounted?

A. 170. Above the hot switch.

Q. 171. On the board?

A. 171. On the board.

Q. 172. And is there anything on the board now to indicate it has been removed?

A. 172. Yes, two screw holes at the top.

By Mr. Moore: Let the record show that the witness is pointing to two screw holes about a foot below the top of the board.

By Mr. Moore:

Q. 173. Is there anything behind the door to show that a Mercoid M-51 control has been put on there as a replacement?

A. 173. Yes, sir.

Q. 174. What does it show?

A. 174. It shows the original oblong slot and two mounting screw holes.

Q. 175. What was the purpose of the slot?

A. 175. To have the trombone part of the instrument enter into this cast iron door.

Q. 176. Who made that slot, rounded out?

A. 176. I did.

1071 Q. 177. And does the lower part of the slot show below the rounded out part?

A. 177. Yes, sir.

Q. 178. And are the two screw holes as you have stated, in the same relation as the two screw holes on either side of the trombone on the lower control?

A. 178. Yes, sir.

Q. 179. Was there any change made in the M-51 control?

A. 179. Yes, I had to reverse the tube from the original set-up.

By Mr. Moore: Let the record show that Mr. Price has closed the room thermostat in the Sunday School room, and the burner switch.

Let the record show that the oil burner is operating and the flame is burning in the furnace.

Let the record show that Mr. Lartz has closed the fan control switch on the door.

Let the record show that the fan motor is operating.

Let the record show that Mr. Lartz has detached the

limit switch and has tilted it to open position; that the burner operation has ceased but the fan blower is
1072 continuing to operate.

By Mr. Moore: Let the record show that Mr. Lartz has opened the fan switch and has closed the limit switch; that the burner is operating and a flame is in the fire pot.

Let the record show that Mr. Lartz has tilted the limit switch to open position and that the burner has ceased operating.

Let the record show that the room thermostat has been closed and that the fan switch has been closed by Mr. Lartz.

Let the record show that Mr. Price has opened the room thermostat and burner has ceased operating, but the fan is still continuing to operate.

Let the record show that Mr. Lartz has released the fan switch and the fan ceased operating.

By Mr. Moore: Let the record show that the inspection of the furnace room at the Evangelical Church terminated at 5:15 o'clock.

1073 By Mr. Moore:

Q. 180. I believe you said that you yourself made the original installation of the controls in the Evangelical Church, did you not?

A. 180. Yes, sir.

Q. 181. And I also believe you said that in the original unstallation two trombone controls were inserted through the door on the side of the furnace leading into a bonnet as shown in the photograph marked Mercoid Exhibit A-3.

A. 181. Yes, sir.

Q. 182. And I believe you said that later the upper trombone control was replaced by a Mercoid M-51 control did you not?

A. 182. Yes, sir.

Q. 183. And did you actually replace that instrument yourself?

A. 183. Yes, sir.

Q. 184. What did you have to do to replace the original instrument?

A. 184. I had to make the hole in the cast iron door larger to insert the new control.

Q. 185. Referring to the photograph marked Mercoid Exhibit A-4, showing the door in the open position, is there anything shown thereon which would indicate that a trom-

bone control had been originally installed where the
1074 upper control has been replaced?

A. 185. Yes, sir, the hole is still there—sort of an oblong hole.

Q. 186. How much of this oblong hole is shown?

A. 186. I would say about half.

Q. 187. And where is it shown?

A. 187. Alongside the round hole I had to bore.

Q. 188. Is there anything else?

A. 188. Yes, two mounting screw holes are shown opposite each other.

Q. 189. Have you any idea as to the date that this original installation was made?

A. 189. No, I don't remember.

Q. 190. But you have no recollection as to the date when these installations were made?

A. 190. I remember they were made in the year of 1926 or 1927.

Q. 191. Do you keep records in your office as to when you make installations?

A. 191. No, that is handled by the Service Department.

Q. 192. Have you any recollection as to when you made this substitution of the upper controls?

A. 192. It was several years after the original installation.

Q. 193. Did you do anything further on the date
1075 that you made this inspection when the photographer took these pictures in connection with this Evangelical Church installation?

A. 193. I made a schematic drawing of the hook-up.

Q. 194. And what did you do with that drawing?

A. 194. I gave it to Mr. Gibson to make up the final drawing.

Q. 195. I show you Mercoid Exhibit H-1 and ask you if you know what that is?

A. 195. That is my schematic drawing of the Evangelical Church.

Q. 196. What is the Mercoid control indicated at the top of this drawing?

A. 196. It is a Mercoid furnace control.

Q. 197. What is it connected to?

A. 197. To the relay.

Q. 198. And what is the relay connected to?

A. 198. To the fan motor.

Q. 199. And where is this relay connected to the source of electricity?

A. 199. From the main switch.

Q. 200. How many wires lead to it?

A. 200. Three.

Q. 201. What is the instrument marked "Mercoid furnace control" just above the square marked "Burner Control Panel"?

1076 A. 201. That is a Mercoid furnace control or limit switch.

Q. 202. Now on the door shown in the picture, Mercoid Exhibit A-3, which is the fan control and which is the furnace control?

A. 202. The top instrument.

Q. 203. And that corresponds to the Mercoid furnace control shown at the top of the drawing?

A. 203. That is right.

Q. 204. This original Mercoid furnace control that was replaced by the one now shown on the door, was that a standard furnace control?

A. 204. Yes, with the exception of the tube reversed.

Q. 205. Who reversed that tube?

A. 205. I did.

Q. 206. When the room thermostat indicated on this drawing closes, what circuit is made?

A. 206. The current flows from the main switch to the burner and when the thermostat is closed it operates the burner.

Q. 207. Does it pass between anything else from the room thermostat to the burner?

A. 207. The Mercoid furnace control.

Q. 208. I show you Mercoid Exhibit H-2 and ask you if the circuit in red thereon is indicated as you have referred?

A. 208. Yes.

1077 Q. 209. After the burner has been operated for a short time, what happens?

A. 209. The fan control turns on and operates the relay and which turns on the fan.

Q. 210. I show you a drawing marked Mercoid Exhibit H-3 and ask you if the circuit shown in blue thereon is the fan circuit that you have just referred to?

A. 210. That is right.

Q. 211. With the burner operating and the fan operat-

ing, if the room thermostat is satisfied and opens, what happens?

A. 211. The burner stops.

Q. 212. What happens to the fan?

A. 212. It continues to operate.

Q. 213. Now in case the burner is operating, the room thermostat is closed, and the fan is operating but the limit control open, what happens?

A. 213. The burner stops.

Q. 214. What happens to the fan?

A. 214. It continues to operate.

Q. 215. I show you Mercoid Exhibit H-4 and ask you if the circuit colored thereon represents the circuit that remains when the burner stops?

A. 215. That is right.

Q. 216. That is when the limit control opens, as indicated on this drawing?

1078 A. 216. Yes, sir, that is right.

Q. 217. You said something about Mr. Dolan. Did you visit Mr. Dolan's residence?

A. 217. Yes, sir.

Q. 218. And who accompanied you?

A. 218. The first time Mr. Price and Mr. McCabe; the second time Mr. Price, Mr. Moore, the photographer and myself.

Q. 219. I show you two pictures marked Mercoid Exhibits B-1 and B-2, and ask you if you know what they are?

A. 219. The installation at the Ned Dolan residence.

Q. 220. What does the picture, Mercoid Exhibit B-1, show?

A. 220. This shows a hot air furnace and a trombone control.

Q. 221. That is the Mercoid trombone control?

A. 221. Yes, sir.

Q. 222. Where is that shown?

A. 222. Mounted above the hot air furnace.

Q. 223. Is that a standard Mercoid control? Can you tell from the picture?

A. 223. It was—yes.

Q. 224. Well, is it now?

A. 224. No, I changed a tube.

Q. 225. Which tube did you change?

A. 225. The top tube.

Q. 226. What does the picture, Mercoid Exhibit B-2, illustrate?

1079 A. 226. A stack switch.

Q. 227. And where is that stack safety located in relation to the furnace shown in Exhibit B-1?

A. 227. About ten feet away from the furnace in the smoke pipe.

Q. 228. I believe you said that this was a hot air furnace?

A. 228. That is right.

Q. 229. Was there any other attachment to this furnace other than the two controls you have just referred to?

A. 229. Yes, a D.S.S. control motor mounted on the burner.

Q. 230. Where is that shown in the picture?

A. 230. On the bottom.

Q. 231. Now are there any other attachments besides the controls placed on this furnace?

A. 231. Stack safety.

Q. 232. Besides controls?

A. 232. A fan.

Q. 233. Where was that located?

A. 233. In the top part of furnace.

Q. 234. Is it shown in this photograph?

A. 234. No.

Q. 235. What was the purpose of this fan?

A. 235. To drive up the hot air to the upstairs rooms.

Q. 236. Was that for the same purpose as the fan in the Church?

1080 A. 236. Yes.

Q. 237. Did you follow the wires from the Mercoid trombone control and the stack safety shown on Mercoid Exhibit B-2 while you were inspecting these premises?

A. 237. Yes.

Q. 238. And what did you do after you inspected the premises?

A. 238. I went to the shop and made a schematic drawing of the installation.

Q. 239. I show you a drawing marked Mercoid Exhibit I-1 and ask you if you know what that is?

A. 239. That is a schematic wiring diagram of the Dolan residence.

Q. 240. Who made that drawing?

A. 240. I did.

Q. 241. Did you make that actual drawing before you?

A. 241. No.

Q. 242. Who made that?

A. 242. Herschel V. Gibson.

Q. 243. And do you know what he made that from?
A. 243. From the original drawing I gave him.
Q. 244. Did you consult with Mr. Gibson while he was making this drawing, Mercoid Exhibit I-1?
A. 244. I checked it after he had it redrawn.
Q. 245. And that represents the wiring that you
1081 found in the Dolan home, does it?
A. 245. That is right.
Q. 246. Who made this installation originally in the Dolan home?
A. 246. I did.
Q. 247. At the time this installation was made, do you recall what type of stack safety was in the smoke pipe, as shown in Mercoid Exhibit B-2?
A. 247. It seems to me it was a Honeywell.
Q. 248. Are you acquainted with the Honeywell stack safety?
A. 248. Yes, sir.
Q. 249. Have you handled very many of them?
A. 249. Yes, sir.
Q. 250. Approximately how many?
A. 250. Probably three hundred.
Q. 251. Do you know whether or not the Honeywell stack switches are still on the market?
A. 251. Yes, sir.
Q. 252. Made by whom?
A. 252. The Minneapolis-Honeywell.
Q. 253. And what are they called? Are they called Honeywell stack safeties?
A. 253. They are called Minneapolis-Honeywell stack safeties.
Q. 254. What is this instrument located in the side
1082 panel in front of the furnace, shown in Mercoid Exhibit B-1?
A. 254. That is the stack safety for the D.S.S. motor control.
Q. 255. Did you install that yourself?
A. 255. Yes, sir.
Q. 256. And do your remember what type stack safety it was?
A. 256. I believe it was a Honeywell.
Q. 257. Have you handled many Minneapolis-Honeywell stack safeties?
A. 257. Yes.
Q. 258. How many?

A. 258. Oh, about a hundred.

Q. 259. Is there any difference in the construction or operation between these two instruments?

A. 259. No.

Q. 260. Is there any difference in the proportion of the casing which contains these instruments?

A. 260. No.

Q. 261. Do you know whether the cover or front plates of these instruments are interchangeable?

A. 261. Yes, they are.

Q. 262. How do you know that?

A. 262. Because I have taken them off. I substituted one that had been on for four or five years for some-
1083 thing I had in my tool box.

Q. 263. Do you answer service calls?

A. 263. On special jobs—yes.

Q. 264. In the early days did you answer service calls?

A. 264. Yes, sir.

Q. 265. Did you ever find the front plates on stack safeties removed?

A. 265. Yes, sir.

Q. 266. What did you do when you found a front plate removed?

A. 266. I went to my tool box and got another one.

Q. 267. And what did you do with this other one you got from your tool box?

A. 267. I placed it on the instrument that needed it.

Q. 268. Referring to the drawing marked Mercoid Exhibit I-1, can you explain briefly the various instruments shown thereon and the wires connected to them, starting at the top and describing each instrument and how they are connected to the circuit.

A. 269. A Honeywell room thermostat closes the circuit, which in turn goes through Mercoid furnace control and back to the D.S.S. motor switch, which turns on the oil burner. After the oil burner is running for a given length of time the Honeywell stack switch, located about ten feet from the furnace, goes into closed position,
1084 which in turn operates the relay and which turns on the fan motor.

Q. 269. I show you a similar drawing here in evidence as Mercoid Exhibit I-2 and ask you what the circuit indicated by red lines is?

A. 269. It indicates the oil burner circuit.

Q. 270. In what position is the room thermostat?

A. 270. Calling for heat.

Q. 271. And where and how does the circuit travel?

A. 271. Current flows from the main switch into the D.S.S. motor and then from the D.S.S. motor through the Mercoid furnace control switch and up through the Honeywell room thermostat and down to the D.S.S. motor switch.

Q. 272. And where is the hand switch located on the drawing to which you have referred?

A. 272. On the right hand side.

Q. 273. What are the three red lines extending above the hand switch.

A. 273. They represent the city line 110 to 220 volts.

Q. 274. Why are three wires needed in this installation?

A. 274. The fan operates on 220 and the burner operates on 110.

Q. 275. I notice on this drawing that the current passes through the upper tube of the Mercoid furnace control. What is the purpose of the lower tube?

1085 A. 275. To turn on the fan when the oil burner stops if the trombone is in the "off" position.

Q. 276. Now after the burner operates a short time you said, I believe, that the fan was turned on.

A. 276. That is right.

Q. 277. I show you a similar drawing marked Mercoid Exhibit I-1, with colored circuits thereon, and ask you what the circuit in red indicates?

A. 277. The circuit in red indicates the oil-burner circuit.

Q. 278. And what does the circuit in blue indicate?

A. 278. It indicates the fan circuit.

By Mr. Moore: The drawing just referred to by the witness is offered in evidence as MERCOID EXHIBIT I-3.

(The drawing just produced was accordingly marked Mercoid Exhibit I-3, and made a part of this deposition.)

By Mr. Moore:

Q. 279. This drawing, Mercoid Exhibit I-3, shows the normal positions of the thermostat when calling for heat, the Mercoid furnace control when the oil burner is operating, the Honeywell stack switch after it has been closed, and the fan motor is operating, is that right?

A. 279. That is right.

1086 Q. 280. Can you describe briefly how the fan motor is operated by the closing of the Honeywell stack switch?

A. 280. This instrument is operated by heat from the

stack as it tilts the tube in the opposite direction, which in this case is closed; that is the contacts are closed.

Q. 281. Then you mean that when it is tilted in the opposite position that it is tilted in the position opposite to what is shown on the drawing, Mercoid Exhibit I-1?

A. 281. That is right.

Q. 282. And does it show on Mercoid Exhibit I-3 that it is in a tilted position to close the circuit through the *mercury tube?*

A. 282. That is right.

Q. 283. And what if the circuit is closed when the stack safety is in this position?

A. 283. It closes the relay which in turn starts the fan.

Q. 284. Now will you please trace that circuit from the hand switch?

A. 284. The current flows from the two 220 volt lines of the hand switch into the relay to control wires from this relay to the Honeywell stack switch which controls the hold-up coil. When energized it allows the current to flow to the motor.

Q. 285. Is this relay of standard construction?

A. 285. Yes, sir.

1087 Q. 286. Do you know what make of relay this is?

A. 286. I think Allen-Bradley.

Q. 287. Is that the same type of relay as shown on page A-67 of Mercoid Exhibit E-2?

A. 287. Yes, sir.

Q. 288. And it is also shown on Mercoid Exhibit F-1?

A. 288. Yes, sir.

Q. 289. If while the room thermostat is still calling for heat and the fan motor is operating, the Mercoid limit control should open the circuit, what would happen?

A. 289. The burner stops and the fan continues.

Q. 290. What stops the burner?

A. 290. The upper tube in the furnace control.

Q. 291. And how does it stop the burner?

A. 291. It causes the circuit to flow on the other side.

Q. 292. What happens to the lower tube when this occurs?

A. 292. It goes into closed position.

Q. 293. What is the lower tube connected to?

A. 293. To the fan relay.

Q. 294. I show you a drawing which I offer as MERCOID EXHIBIT I-4, and ask you what is the circuit indicated in green thereon?

A. 294. That is the "off" cycle or "off" position of the Honeywell D.S.S. motor switch.

1088 Q. 295. When this drawing shows the room thermostat in the position it assumes in closing the red circuit on drawing, Mercoid Exhibit I-3, the Honeywell stack switch in closed position, and the Mercoid furnace control with the two tubes tilted in a position opposite to that shown in Mercoid Exhibit I-2, you have said that the green circuit shuts down the motor, is that right?

A. 295. That is right.

Q. 296. And now can you explain how the motor is shut down by this green circuit?

A. 296. Yes, the active current flows from the center contact of the Honeywell D.S.S. motor to the center contact of the tube in the Mercoid furnace control and makes contact with the "off" side of the Honeywell D.S.S. motor switch.

Q. 297. In Mercoid Exhibit I-2, the circuit in red is shown from the room thermostat to which side of the D.S.S. motor?

A. 297. To the "on" side.

Q. 298. Then am I to understand that when the Mercoid furnace control has been operated to the position shown in Mercoid Exhibit I-4, the circuit from the "on" side is broken and the circuit to the "off" side of the Honeywell circuit is closed?

A. 298. Yes.

1089 Q. 299. Did you state what made these two tubes in the Mercoid furnace controls tilt to assume the position shown on Mercoid Exhibit I-4?

A. 299. Excessive heat in the heating chamber of a hot air furnace.

Q. 300. And at the time the Mercoid furnace control is tilted to this "position, I believe you said another circuit to the relay was established, is that correct?

A. 300. Yes, sir.

Q. 301. And that is shown by the blue circuit leading from the lower tube to the relay?

A. 301. Yes, sir.

Q. 302. Why was it necessary to provide this additional circuit to the relay?

A. 302. Because when the burner stops, the heat goes out of the stack which the Honeywell stack switch is located in, causing that tube to be in the "off" position.

Q. 303. I show you another drawing similar to Mercoid

Exhibit I-1, in which the parts are in the same position as in Mercoid Exhibit I-4, except the Honeywell stack switch is tilted to open the circuit therethrough, and ask you if the colored lines on this drawing indicate the circuit you have just described?

A. 303. Yes, sir.

1090 By Mr. Moore: The drawing just referred to by the witness is offered in evidence as MERCOID EXHIBIT I-5.

(The drawing just offered was accordingly marked Mercoid Exhibit I-5, and made a part of this deposition.)

By Mr. Moore:

Q. 304. The green lines represent what circuit?

A. 304. The "off" circuit when shut down from the excessive heat.

Q. 305. And the blue lines indicate what?

A. 305. The fan relay circuit.

Q. 306. And what is the effect of closing this blue circuit before the Honeywell stack switch opens?

A. 306. None.

Q. 307. What happens to the fan motor?

A. 307. The fan motor is still in the "on" position on account of the Honeywell stack switch being in the "on" position.

Q. 308. You apparently did not understand my question. Will you read the question back to the witness?

(The pending question as above recorded was read by the Reporter.)

A. 308. It continues to operate the fan relay.

Q. 309. If the burner was operating normally upon

1091 the closing of the room thermostat to hold the circuit through the closed limit control to the Honeywell D.S.S. motor, and the Honeywell stack switch had closed to operate the fan as shown in Mercoid Exhibit I-3, and the room thermostat became satisfied, what would happen?

A. 309. The oil burner stops.

Q. 310. And how does the oil burner stop?

A. 310. By the thermostat element forming a contact on the opposite side.

Q. 311. I show you here a similar drawing offered as Mercoid Exhibit I-6, and ask you what the circuit in green indicates?

A. 311. That represents an "off" cycle of the thermostat.

By Mr. Moore: I offer the drawing just identified by the witness as MERCOID EXHIBIT I-6.

(The drawing just produced by the witness was accordingly marked Mercoid Exhibit I-6, and made a part of this deposition.)

By Mr. Moore:

Q. 312. When the room thermostat is satisfied and moves to the "off" position to establish the circuit shown in green in Mercoid Exhibit I-6, what happens to the fan?

1092 A. 312. The fan motor runs about four or five minutes and then stops.

Q. 313. And what stops the fan motor?

A. 313. The Honeywell stack switch goes into "cold" position, opening the tube which operates the fan relay.

Q. 314. While you were at the Dolan residence with the photographer, Mr. Price and Mr. Moore, was there any demonstration made as to the operation of these controls?

A. 314. Yes, sir.

Q. 315. Who conducted that demonstration?

A. 315. I did.

Q. 316. Did you inspect the room thermostat in the dwelling?

A. 316. I did.

Q. 317. And you found it the type of room thermostat that is indicated on that drawings?

A. 317. Yes, sir.

Q. 318. Mercoid Exhibit I-1 and the rest of the series?

A. 318. I did.

By Mr. Moore: Adjourned for lunch.

By Mr. Moore: Let the record show that we convened at the home of Ned E. Dolan, 301 North Mercer Avenue. Let the record show that the room thermostat in the dining room was inspected.

1093 Q. 319. What is the marking on the name plate of the room thermostat.

A. 319. Minneapolis.

Q. 320. Can you see what type of thermostat that is?

A. 320. I think it is what they call the "55".

Q. 321. And is it a two or three-wire?

A. 321. Three wire.

By Mr. Moore: Let the record show that the Parties visited the furnace room on the floor below.

By Mr. Moore:

Q. 322. Now where is the fan blower?

A. 322. It is on the back side of the furnace.

By Mr. Moore: Let the record show that counsel and witness inspected the furnace fan at the back of the furnace shown in the picture, Mercoid Exhibit B-1.

By Mr. Moore:

Q. 323. What is that instrument on the top of the Oil-O-Matic burner in a black case?

A. 323. Honeywell D.S.S. motor control.

Q. 324. What is the instrument in the left panel on the furnace, Mercoid Exhibit B-1?

A. 324. Minneapolis.

1094 Q. 325. I am asking you what the instrument is?

A. 325. A stack safety.

Q. 326. Is there any cover on that stack safety?

A. 326. Yes.

Q. 327. Is there anything at the top of the casing and across the front there? What does it say?

A. 327. It tells you how to mount it in the stack.

Q. 328. Is there any name on there?

A. 328. No, sir.

Q. 329. Is the cover hanging from the lower screw as shown in the photograph?

A. 329. Yes.

Q. 330. Will you kindly reverse the cover so it will be in the proper position?

A. 330. Yes, I have.

Q. 331. Now will you please see what is on the cover in the way of identification?

A. 331. "Type B-99 Combustion Safety Control Stack, Minneapolis-Honeywell Company."

Q. 332. What is the serial number?

A. 332. It has no serial number. Well here is "CS-60408."

Q. 333. Will you open the cover again to inspect the internal arrangement?

A. 333. I have.

1095 Q. 334. Is there anything in that arrangement that will identify this stack safety as a product of the Honeywell or the Minneapolis-Honeywell Company?

A. 334. Well I would say there is no difference.

Q. 335. Do you mean to say then that there is no difference between the Honeywell stack safety and the Minneapolis stack safety?

A. 335. No.

Q. 336. I notice a circular casing at the upper right-hand side of the furnace?

A. 336. That is a Mercoid furnace control.
Q. 337. Can you see the trombone?
A. 337. Yes, sir.
Q. 338. Where is it?
A. 338. On the right-hand side of the furnace.
Q. 339. And is that connected to this case?
A. 339. Yes, sir.
Q. 440. How?
A. 440. With a copper tube filled with gas.
Q. 441. What supports the casing?
A. 441. A regulation hanger mounted on a wood block.
Q. 442. Can you take the cover off of that casing?
A. 442. Yes, sir. (Witness removes cover.)
Q. 443. What appears on the front of the casing and around the hole?

1096 A. 443. It says "Mercoid Switch."

Q. 444. Now look through the hole. How many switch tubes do you see?
A. 444. Two.
Q. 445. What is the upper tube?
A. 445. It is the tube that connects with the oil burner control.
Q. 446. How many contacts does it have?
A. 446. It is commonly known as a 2-circuit tube—three-wire, two-circuit tube.
Q. 447. And that is the lower tube?
A. 447. The fan control.
Q. 448. Did you buy that instrument with the two tubes in it, do you know?
A. 448. No, I added the tube.
Q. 449. You added the tube yourself?
A. 449. Yes, sir.
Q. 450. Which one?
A. 450. The lower tube.

By Mr. Moore: Let the record show that counsel and witness went into the room at the left-hand side of the furnace through which the smoke pipe passes into the chimney, and the witness's attention was called to an in-

1097 strument in the smoke pipe such as is shown in the photograph, Mercoid Exhibit B-2.

By Mr. Moore:
Q. 451. What is the instrument shown at the left-hand side of this smoke pipe.
A. 451. It is a Honeywell stack safety.

Q. 452. How do you know that it is a Honeywell stack safety?

A. 452. By its construction.

Q. 453. And is that the same as the Honeywell stack safety in the other room?

A. 453. Originally, yes, but it has the changed tubes in it.

Q. 454. That is the original instrument that you changed?

A. 454. That is right.

Q. 455. Is there any cover or front plate on this instrument?

A. 455. There was originally, yes.

Q. 456. And is there one now?

A. 456. No.

Q. 457. What tubes did you change in this stack safety?

A. 457. Both tubes.

Q. 458. Does it now have two tubes?

A. 458. Yes, sir.

Q. 459. In the drawing illustrating the wiring diagram of this installation only one tube was shown in the stack safety. What is the purpose of the other tube that you see in there?

1098 A. 459. To operate an independent oil pump.

Q. 459. Then the second tube has nothing to do with the operation of the fan?

A. 459. Nothing.

Q. 461. Which tube shown in the stack safety is connected to the fan?

A. 461. The lower or larger tube.

Q. 462. That is a different type of tube in the Mercoid furnace control, is it not?

A. 462. Yes, sir.

Q. 463. Can you tell what kind of tube that is from the shape of it?

A. 463. It is the contactor.

By Mr. Moore: Let the record show that witness has been asked to operate the room thermostat to the position calling for heat, and has closed the switch to the line.

Let the record show that the oil burner is beginning to operate and the flame is now burning.

Let the record show that the stack safety as shown in Mercoid Exhibit B-2, is closed and the fan began to operate immediately.

1099 By Mr. Moore:

Q. 464. Will you please operate the mercury tube

switches in the furnace control by hand to tilt them in the opposite direction?

By Mr. Moore: Let the record show that the oil burner ceased to operate, and also let the record show that the fan is still operating.

By Mr. Moore:

Q. 465. Will you please release the mercury tubes in the Mercoid furnace control and return them to their original or closed position?

By Mr. Moore: Let the record show that after a short space of time the oil burner began to operate again.

Let the record show that when the limit control stopped the burner, the stack safety, shown in Mercoid Exhibit B-2, returned to "off" position; and several minutes after the oil burner began to operate, and after the limit control was closed, the fan began to operate.

By Mr. Moore:

Q. 466. Will you now please move the room ther-
1100 mostat to the satisfied or "off" position?

By Mr. Moore: Let the record show that the oil burner ceased to operate and the fan continued to operate until the stack safety, shown in Mercoid Exhibit B-2, returned to open position, which occurred about one minute and forty seconds after the burner stopped operating.

By Mr. Moore:

Q. 467. Do you find the original relay on the fan?

A. 467. No, but a speed reduction regulator has been applied in place of the relay so they can vary the speed of the fan.

By Mr. Moore: Now let the record show that upon leaving the Dolan residence an adjournment was taken, and that the Parties reconvened at 3:00 o'clock at Room 503 of the Illinois Hotel.

By Mr. Moore: Direct examinatioon closed.

By Mr. Freeman Cross-Examination.

By Mr. Freeman:

X-Q. 468. Did you talk to the dealer who wanted a garage installation?

1101 A. 468. No.

X-Q. 469. Were you ever in a garage with such an installation?

A. 469. No.

X-Q. 470. Then to the best of your recollection, you

probably had something to do with the drawings, Mercoid Exhibit F-1, is that correct?

A. 470. That is correct.

X-Q. 471. But you are not sure?

A. 471. Yes, I am sure.

X-Q. 472. And with whom did you discuss the drawings?

A. 472. Mr. Price.

X-Q. 473. And who told you a dealer brought in the problem?

A. 473. Mr. Price.

X-Q. 474. But you don't know this of your own personal knowledge?

A. 474. No.

X-Q. 475. And who told you it was for someone on the Springfield road, south of Bloomington?

A. 475. Mr. Price.

X-Q. 476. And of course you don't know of your own independent knowledge?

A. 476. Yes.

X-Q. 477. When were you told by Mr. Price that it 1102 was for someone who was located south of Bloomington?

A. 477. About a month ago when we were discussing the blue print for the wiring.

X-Q. 478. And did you review the print about a month ago with Mr. Price?

A. 478. Yes.

X-Q. 479. And it was then for the first time that you learned about the dealer and garageman?

A. 479. I probably knew about it at the time the drawing was made but I had forgotten the incident. However, Mr. Price refreshed my memory.

X-Q. 480. But you never talked to the dealer or to the garageman?

A. 480. No.

X-Q. 481. Nor anyone else who wanted such an installation?

A. 481. No.

X-Q. 482. The thermostat in the Dolan residence was a Minneapolis thermostat as distinguished from a Honeywell thermostat, correct?

A. 482. Right.

X-Q. 483. And in that respect the Mercoid Exhibits I-1 to I-4 are incorrect?

A. 483. Yes, we spoke of all those thermostats as Minneapolis Honeywells.

1103 X-Q. 484. Did you speak of them as "Honeywell" thermostats as late as October, 1940?

A. 484. Yes, it is shorter to say.

X-Q. 485. And did you refer to them as "Honeywell" thermostats prior to the merger of the Honeywell Company and the Minneapolis Company?

A. 485. Yes.

X-Q. 486. That is you referred to the Honeywell thermostat, or rather you referred to a thermostat as a Honeywell thermostat even though as a matter of fact it was a Minneapolis thermostat?

A. 486. That is right.

X-Q. 487. You made no distinction then?

A. 487. No.

X-Q. 488. And then you made no distinction as recently as October, 1940?

A. 488. That is right.

X-Q. 489. What was the reason for omitting from the drawings of the Mercoid Exhibit I series the stack switch which we saw today, and which is a Minneapolis-Honeywell stack switch?

A. 489. Well, it is just common shop talk that whenever we speak of any kind of a thermostat we speak of it as a "Honeywell," or Honeywell equipment.

1104 By Mr. Freeman: Read the question.

(The pending question as above recorded was read by the Reporter.)

By Mr. Freeman:

(Witness Continuing.) We did not think it necessary to show it.

X-Q. 490. Any other reason?

A. 490. That is all.

X-Q. 491. And do you have the pencil sketch you made at the time of your inspection on October 2, 1940?

A. 491. I do not have it; I gave it to Mr. Price.

X-Q. 492. Do you recall whether or not it included a Minneapolis-Honeywell stack switch?

A. 492. No, I don't.

X-Q. 493. The Honeywell stack switch which is in the stack, and I call your particular attention to the fact that when I say "Honeywell" I don't mean the Minneapolis Company, nor do I mean the Minneapolis-Honeywell Company, included a pump switch, did it not?

A. 493. Yes.

X-Q. 494. And that is the stack switch shown on Mercoid Exhibit B-2?

A. 494. Right.

X-Q. 495. And when was the oil pump disconnected from the stack switch shown on Mercoid Exhibit B-2?

1105 A. 495. I don't know exactly, but I know it has been over five years ago.

X-Q. 496. Did you disconnect it?

A. 496. I disconnected the motor on the pump appliance, yes.

X-Q. 497. Were other changes made in the Dolan installation?

A. 497. Why the original relay was taken out and a speed—combination speed—regulator and relay was introduced into the circuit by another company. I didn't have anything to do with it because we did not sell that equipment. The American Foundry & Furnace Company put that in.

X-Q. 498. Are you sure there is a relay in that combination speed regulator?

A. 498. No, I didn't notice.

X-Q. 499. Then when you made your inspection on October, 1940 you did not actually check the wiring as you have testified this morning, did you?

A. 499. Well I just supposed that style of relay was still there; I did not pay any attention.

X-Q. 500. Then you constructed the layout drawing on October 2, 1940 from memory rather than from actual inspection?

A. 500. Right.

X-Q. 500. Then the notation on the drawing, Exhibit I-1 entitled "Wiring Diagram," when inspected on October 2, 1940 is really a misstatement?

1106 A. 500. No, I would not say it was because I think there is still a relay in the circuit because I don't think the tubes in the present hook-up would stand the starting current of the motor.

X-Q. 501. Is that stated as a matter of fact or as a guess on your part?

A. 501. As a guess.

X-Q. 502. You don't know?

A. 502. No.

X-Q. 503. And when you made your inspection in com-

pany with Mr. O. H. Price you did not check the wiring actually at the Dolan residence?

A. 503. Not at the relay, no; it was in another room.

X-Q. 504. Did you have any old drawings or circuit layouts that gave you any information as to the original Dolan installation?

A. 504. No, I made them at the time the job was put in but I mislaid them.

X-Q. 505. You definitely want to say that you made drawings at the time?

A. 505. Yes.

X-Q. 506. And that it was necessary, in order to make the Dolan installation, to have some layout drawings which you do not have at the present time?

1107 A. 506. Right.

X-Q. 507. I take it that originally the Honeywell stack switch which was mounted in the stack was actually to serve as a stack switch?

A. 507. That is right.

X-Q. 508. And how long was it in the stack functioning as a stack switch until you changed it so it might function otherwise?

A. 508. Since its original installation—when it was first put in.

X-Q. 509. And did it serve as a stack swith originally?

A. 509. It served as a fan and pump switch originally?

X-Q. 510. Then it was never put in as a stack switch?

A. 510. Well it was a switch that was in the stack and was operating—

X-Q. 511. What I mean was this stack switch ever used as a stack safety?

A. 511. It was never used as a stack safety.

X-Q. 512. And if Mr. Price testified that it was originally put in as a stack safety, he must have been in error?

A. 512. Yes.

X-Q. 513. Then I take it that there were two stack safeties on the job at the Dolan residence?

A. 513. No, sir—there was one—one stack switch.

X-Q. 514. Now in your testimony this morning you

1108 stated that the cover might have been removed or lost, and that you replaced it with one taken from your tool kit. Do you recall so testifying?

A. 514 Yes, sir.

X-Q. 515. Now tell us, as a matter of fact, just what did take place in connection with the stack switch on the front

of the furnace which now includes a Minneapolis-Honeywell cover plate, if you know.

A. 515. It has been a standing order with our institution that when we see the cover off of a stack plate we should put it back on in order to protect the inside. It has been a common practice among some service men to remove the cover as they thought it interfered with the working of the control.

X-Q. 516. Incidentally, you knew that the cover was off of the stack switch today at the Dolan residence?

A. 516. Yes, sir. There was one there when the stack plate was put in, but what became of it I don't know.

X-Q. 517. You recall, do you, whether you put on one part of the cover, or did you put on two parts?

A. 517. I do not recall two. I recall putting on one.

X-Q. 518. And you know, do you not, that the cover parts used by the Honeywell Company and the parts used by the Minneapolis-Honeywell Company are entirely
1109 different, so if you put one one part it would not coincide with the other part of the cover?

A. 518. It does not occur to me that there was any difference in them; it has been some years since I changed any.

X-Q. 519. You know, do you not, that on the Honeywell cover plate there was an arrow?

A. 519. It seems to me there was.

X-Q. 520. And on the Minneapolis cover plate and its component part the arrow ran from the cover plate across the component part?

A. 520. I never pay any attention to names—Honeywell or Minneapolis-Honeywell—as long as it serves the purpose that I intend it to.

X-Q. 521. You would not want to admit that the stack switch was a Minneapolis-Honeywell stack switch and not the original stack switch as you have testified this morning?

A. 521. To my knowledge it has never been changed.

X-Q. 522. And if you had changed it you would know about it?

A. 523. Yes.

X-Q. 523. So that if the stack is a Minneapolis stack switch then it was put on by someone other than yourself?

A. 523. No, I would have put it on myself.

1110 X-Q. 524. And then if it is a Minneapolis-Honeywell stack switch, you are mistaken as to its being the original stack switch?

A. 523. As I said before, I never pay much attention to what the names are on the switches, as long as they serve the purpose, whether it was a Minneapolis-Honeywell or straight Honeywell.

X-Q. 524. What I want to know is whether or not the stack switch on the tube that we saw today is the original safety stack switch as you have testified?

A. 524. To my knowledge, yes.

X-Q. 525. Or whether or not it is a later one?

A. 525. To my knowledge, it is the original stack safety.

X-Q. 526. Have any of your assistants done any work at the Dolan home?

A. 526. Yes.

X-Q. 527. Might they have made a change in the equipment?

A. 527. I do not think so because as a rule none of them are familiar with the D.S.S. motor control but myself.

X-Q. 528. The changing of a stack switch would not necessarily require knowledge of the D.S.S. motor, would it?

A. 528. No.

X-Q. 529. So that a service man could have changed
1111 the stack switch without your knowledge?

A. 529. That is right.

X-Q. 530. But you still want to say that the stack switch is the original?

A. 530. Yes, because it has an extra long helix, and we do not stock those in our stock room. It was originally put on that way.

X-Q. 531. Well the Minneapolis-Honeywell Company makes a stack switch with a long stack, does it not?

A. 531. Yes.

X-Q. 532. So that the stack switch now on the job is a standard Minneapolis-Honeywell stack switch, is it not?

A. 532. The stack switch is ours but not the safety.

X-Q. 533. Are you telling us now that the stack switch safety which has been mounted on the door of the furnace is not a standard Minneapolis-Honeywell product?

A. 533. I think you have to order them special with the double helix, which was done at the time of the installation.

X-Q. 534. Not from the Minneapolis-Honeywell Company?

A. 534. I don't know who they buy them from.

X-Q. 535. Would you recognize the terminology "Honeywell Switch" and point out on the Dolan installation the unit corresponding to Honeywell switch?

A. 535. Yes, this one (Witness referring to the stack switch safety on the furnace door, pointing to Mercoid 1112 Exhibit B-1).

X-Q. 536. And what is the safety referred to in the invoice, Mercoid Exhibit D-1, in connection with the Dolan installation?

A. 536. The item is marked "Honeywell Switch & Safety".

X-Q. 537. Is that the only item?

A. 537. Yes.

X-Q. 538. What is the "Model G Honeywell"?

A. 538. When we mount the D.S.S. motor control switch on our safety switch we call it the Model "G" Honeywell; that was the name around the plant.

X-Q. 539. Then I take it there was a stack switch and a safety switch put on the installation at the same time?

A. 539. Yes.

X-Q. 540. Now will you please turn to the invoice, Exhibit D-1, and point out which item is the stack switch and which item is the stack safety switch?

A. 541. I don't think at the time the original bill was made out that we billed for this extra stack switch for the fan control as that was an after thought of the architect to have the fan controlled from the burner.

X-Q. 542. So that originally the stack safety was mounted on the door or under in the furnace flue?

A. 542. The stack safety was always mounted on the furnace door.

1113 X-Q. 543. And if you differ from Mr. Price with regard to this explanation, I take it that Mr. Price is in error.

A. 543. Yes.

X-Q. 544. How many times have you been at the Dolan home in the last ten years?

A. 544. Probably three times. I am not a regular service man. I take care of electric complaints when the regular service man cannot fix them.

X-Q. 545. So that changes might have been made that you would not know about by your other service men?

A. 545. No, because they always tell me about it if they have to make any unusual change, as a matter of record.

X-Q. 546. Have you any record with regard to this?

A. 546. No, they just told me verbally what they did.

X-Q. 547. So that you mean by "record" a verbal explanation?

A. 547. Yes.

X-Q. 548. You would not take a piece of equipment out of the Williams plant to make an installation without getting an invoice for it, would you?

A. 548. No.

X-Q. 549. Do you find on the invoice, D-1, any mention of a Mercoid control?

A. 549. No.

X-Q. 550. We did see a Mercoid control there today, did we not?

1114 A. 550. That is right.

X-Q. 551. Might it have been installed later than the rest of the items referred to in the invoice, Exhibit D-1?

A. 551. No, because I did the job at the time the house was built, and I know it was put there; but it comes to my mind that the American Foundry & Furnace Co. had to pay extra to have the fan connected up so it would operate with the burner at the time the home was built.

X-Q. 552. Then I take it that you did not connect up the fan but that that was done by the American Foundry & Furnace Co.?

A. 552. I did connect the fan proper but the electrician brought me their wires so I could hook same up to their equipment.

X-Q. 553. And that was when the house was built?

A. 553. Yes.

X-Q. 554. Didn't I understand you to say today that originally the furnace was a coal-fired furnace?

A. 554. It was never a coal-fired furnace; it has been oil-fired ever since the house was built.

X-Q. 555. It was never coal-fired?

A. 555. Never coal-fired—no, sir.

X-Q. 556. Do I understand that the American Foundry & Furnace Co. paid extra for the Mercoid control and for the hook-up of the fan?

1115 A. 556. I think they did.

X-Q. 557. But you are not sure?

A. 557. I don't know whether it was a donation or not. At that time the American Foundry and Williams worked

on jobs together to their best interest. It may have been a gift.

X-Q. 558. What would a control of the kind we saw this afternoon in the Dolan residence, the Mercoid control, sell for?

A. 558. I would not know myself.

X-Q. 559. The control was not a standard Mercoid control but one that you made here?

A. 559. It was a brand new control at the time but I added an extra tube to make it do the things that I wanted it to do.

X-Q. 560. You referred to Mercoid E-1 this morning in identifying the two-circuit tube. Will you now look at Mercoid Exhibit E-1 and tell us what a control with two tubes, such as we saw this afternoon at the Dolan residence, would sell for?

A. 560. The tube itself?

X-Q. 561. And the control.

A. 561. Well, it says here in the catalog $8.70 for the tube, and a single pole switch, Figure 50, would sell for $40.00.

1116 X-Q. 562. Would you say that the Mercoid single pole switch and the two-circuit contact tube of Figure 50 were taken to the Dolan residence at the same time that the Honeywell switch safety was taken to the Dolan residence?

A. 562. I don't recall whether they were taken identically the same day, but undoubtedly had been put there before the job was started.

X-Q. 563. You know that we have no invoice and nothing has been introduced to show the sale of the Mercoid single pole control and the two-circuit contactor tube? You know that, do you not?

A. 563. Yes.

X-Q. 564. And the best explanation that you want to make is that it was a donation on the part of Williams or the American Foundry & Furnace Co.?

A. 564. To my knowledge, yes.

X-Q. 565. Have you checked that information with regard to this donation?

A. 565. No.

X-Q. 566. As a matter of fact you don't know of your own personal knowledge how the Mercoid single pole control and the two-circuit tube came to the Dolan residence?

A. 566. No; it is too far back to remember.

X-Q. 567. Your memory was rather good, was it not, in connection with the Allen-Bradley relay in the
1117 Dolan residence?

A. 567. That was standard equipment on nearly all the fan equipment at that—the Allen-Bradley.

X-Q. 568. Do you know when the Allen-Bradley relay was removed from the residence?

A. 568. No, I do not.

X-Q. 569. As a matter of fact you did not know it was removed until today?

A. 569. That is right.

X-Q. 570. And you did not notice it was removed when you made the inspection on October 2, 1940?

A. 570. That is right; I recognized the black box and I supposed that was the original relay; I did not pay any attention.

X-Q. 571. The Allen-Bradley box is quite different from the General Electric speed device that you saw today at the Dolan residence?

A. 571. It comes to my mind that they were about the same size originally.

X-Q. 572. You are familiar with the Allen-Bradley box, are you not?

A. 572. Yes.

X-Q. 573. And you know the large red letters "A" and "B" on the Allen-Bradley control box?

1118 A. 573. Yes.

X-Q. 574. You noticed, did you not, the name, "G. E." on the speed regulator that we saw today?

A. 574. Yes.

X-Q. 575. You knew when you made the layout drawing and checked the circuit at the Dolan residence that you were going to testify under oath as to the installation and the inspection that you made, did you not?

A. 575. Yes, sir.

X-Q. 576. And you were, in connection with part of the circuit at least, so willing to rely entirely upon your memory of a long time ago?

A. 576. Right.

X-Q. 577. Now what have you testified to today that you were relying on your memory of a long time ago?

A. 577. The whole thing.

X-Q. 578. I take it that in your work with Williams you have done considerable service work?

A. 578. Electrical service only.

X-Q. 579. And that back in 1926 and 1927 the Williams Company ran a campaign, did they not?

A. 579. That was a local campaign; it runs in my mind.

X-Q. 580. And you installed some one hundred local oil burners at that time?

1119 A. 580. It se med that we did.

X-Q. 581. And I take it in the years that have transpired since then you have installed a good many hundreds of oil burners in the Bloomington local territory?

A. 581. Yes, sir.

X-Q. 582. Now what other installations corresponding to the Dolan residence have you installed say prior to January 1, 1935?

A. 582. Well the Evangelical Church is one I remember, and in a number of homes. I don't recall where they are at.

X-Q. 583. Your memory does not serve you in that direction?

A. 583. Not unless I see the house and what transpired there.

X-Q. 584. You were requested by Mr. McCabe in the last month or two to refresh your memory?

A. 584. Yes, sir.

X-Q. 585. And have you endeavored to refresh your memory?

A. 585. After inspecting these jobs, it comes home to me, yes.

X-Q. 586. It comes home to you by memory?

A. 586. That is right.

X-Q. 587. Prior to January 1, 1930, did you or Williams purchase any furnace controls from Mercoid or Federal Gauge having two tubes corresponding to what we saw on this fan at the Dolan residence?

1120 A. 587. I cannot say; I am not in the Purchasing Department.

X-Q. 588. Did you ever use any two-tube jobs yourself where you installed the exterior or second tube?

A. 588. I cannot recall any—no.

X-Q. 589. That is any two-tube jobs that you yourself made up?

A. 589. I made up a blue print one time for a thermostat with two tubes, but I cannot at the moment recall any furnace switches being changed over to two-tubes.

X-Q. 590. Do you recall if any installation that you made prior to January 1, 1930 employed the use of two tubes in the single control?

A. 590. Before 1930?

X-Q. 591. Yes.

A. 591. Yes, I did the Dolan job.

X-Q. 592. Any other?

A. 592. I cannot think of any right now.

X-Q. 593. You were not sure this morning when the Dolan job went in?

A. 593. It went in in either 1926 or 1927. We would have a requisition as to parts.

X-Q. 594. And would the requisition for parts show what went into the Dolan installation?

1121 A. 594. Yes, not necessarily the extras, but anything that was standard equipment at that time.

X-Q. 595. I take it that your last remark, "not necessarily the extras", was particularly directed to the Mercoid switch that we saw on this fan?

A. 595. That is right.

X-Q. 596. Anything that was standard would be included in the parts list requisition?

A. 596. That is right. If my memory serves me correctly, the limit switch was extra on all jobs that were furnished as standard equipment until the last ten years.

X-Q. 597. Then if Mr. Price testified that installations were never made without a limit switch, he must have been in error?

A. 597. We always recommended them to buy one, but it was not compulsory; they took their own chance on it.

X-Q. 598. So that if a limit switch was put in, it was when the user would buy it?

A. 598. Buy—pay extra, yes.

X-Q. 599. And if in addition to the limit switch you went to the trouble to make up a special switch, you would not give that away, would you?

A. 599. We might, if it happened to be a special job—where it was to be used as a sort of show job at that time for future installations.

1122 X-Q. 600. Just how many people did you show the installation at the Dolan house to?

A. 600. Personally none, but the salesmen might have.

X-Q. 601. But you did not show it to anyone?

A. 601. No.

X-Q. 602. Did you connect up the 3-wire thermostats with D.S.S. Honeywell motors in oil burner installations for use as a limit control?

A. 602. No, we always sold them a limit switch. The

price of Honeywell equipment did not include a limit switch; that was extra.

X-Q. 603. Then you did not leave it up to the user to determine whether a limit switch was to be used?

A. 603. We explained to him the duties of it and generally he recommended that one be installed.

X-Q. 604. You have just testified that you never made an installation without the use of a limit switch, is that correct?

A. 604. That is correct.

X-Q. 605. So that the limit switch was not really an "extra"?

A. 605. Yes, it was an extra precaution.

X-Q. 606. And standard equipment?

A. 606. No, it was not standard. We sold them with the D.S.S. motor and thermostat which was consid-
1123 ered one item, and if a limit switch was wanted that was another item. It did not have to be on the job but was generally put on.

X-Q. 607. And I take it that when you sold a Mercoid control box and stack safety, you always included a limit switch.

A. 607. No, not unless they paid extra for it.

X-Q. 608. Are you using the term "extra" as a precaution or as to the payment of money?

A. 608. The payment of money.

X-Q. 609. When they purchased the Honeywell thermostat and the Honeywell D.S.S. motor, they always purchased and paid extra for the limit control, is that correct?

A. 609. To my knowledge, yes.

X-Q. 610. And did you ever install a Mercoid thermostat and control box with a stack safety without using a limit control?

A. 610. Yes, sir.

X-Q. 611. Where?

A. 611. I cannot recall any right now, but in the pioneer days of oil burning it was quite frequent, due to their cost I presume.

X-Q. 612. Just what time do you refer to as the "pioneer days"?

A. 612. Oh, from 1930 to 1933—around about 1930.

1124 X-Q. 613. Then prior to 1930 it was "pioneer days"?

A. 613. Yes.

X-Q. 614. So that when the Dolan installation was made, as you have stated, it was in the "pioneer days"?

A. 614. Right.

X-Q. 615. And it could have been installed without the use of a limit control?

A. 615. It could have been, yes; but at that particular time I absolutely know it was not.

X-Q. 616. But you have no record at all of the sale of a limit control or any special control for operating a fan?

A. 616. That is right.

X-Q. 617. And you have no wiring diagram showing the Dolan installation, made at or about the time of the installation?

A. 617. No, sir.

X-Q. 618. And it did require some drawings at the time according to your testimony?

A. 618. Working drawings, yes.

X-Q. 619. And those drawings were mislaid or lost?

A. 619. That is right.

X-Q. 620. Who made those original drawings?

A. 620. I did.

X-Q. 621. Not Mr. Gibson?

A. 621. No, sir.

X-Q. 622. Did Mr. Price see them?

1125 A. 622. No, sir.

X-Q. 623. They were your own personal drawings?

A. 623. That is right.

X-Q. 624. Who helped you with the Dolan installation?

A. 624. Nobody; I did the electric work myself.

X-Q. 625. And installed the controls?

A. 625. Yes, sir.

X-Q. 626. Did anyone check the installation after you put it in?

A. 626. No, outside of the service man. I was always there at the time the work was started and would explain it to the service man.

X-Q. 627. Who was with you at the Church when the work was first started?

A. 627. You mean when the original installation was put in?

X-Q. 628. Yes.

A. 628. I did all of that electric work myself.

X-Q. 629. And drew this tracing yourself?

A. 629. Yes, sir.

X-Q. 630. Of the service work in connection with the controls?

A. 630. Yes, sir.

X-Q. 631. And who was there when the change was made?

A. 631. Nobody but myself.

1126 X-Q. 632. What ran the furnace fan at the Church between the time of the original installation and when, as you have stated, you put in the furnace controls?

A. 632. Before the oil burner was installed it was operated by a hand switch, a two-pole hand switch.

X-Q. 633. Was that the hand switch that we saw last evening at the Church?

A. 633. Yes.

X-Q. 634. That is, that was one of the original hand switches for starting and stopping of the fan?

A. 634. That is right.

X-Q. 635. And I take it then that after the oil burner was installed—for some time at least—the fan was operated by the hand switch?

A. 635. It was operated automatically from a trombone control with the reverse tube.

X-Q. 636. The Church installation had two thermostats?

A. 636. That is right.

X-Q. 637. And they were put in at different times?

A. 637. No, at the time of installation.

X-Q. 638. Both put in at the same time?

A. 638. Yes, sir.

X-Q. 639. And you put them both in?

A. 639. Yes, sir.

1127 X-Q. 640. And you are testifying from memory?

A. 640. Yes, sir.

X-Q. 641. And then I take it, right from the start when the Church put in its oil burner, the fan was controlled by a fan control?

A. 641. No, it was originally controlled by a Mercoid limit switch with a reverse tube, and from which we made a fan control.

X-Q. 642. That was done originally?

A. 642. Yes, sir.

X-Q. 643. When the oil burner was installed?

A. 643. Yes, sir.

X-Q. 644. You do not recall what time of year the installation was made?

A. 644. It seems to me it was in the early Fall.

X-Q. 645. Have you checked the wiring in the Church installation?

A. 645. Just recently, yes, to make a print off of it.

X-Q. 646. And did you notice that the hand switch was different than the hand switch originally on the job?

A. 646. I noticed that it was the original hand switch.

X-Q. 647. You are sure of that?

A. 647. Yes, sir.

X-Q. 648. I take it that you did some work in con-
1128 nection with the original hand switch?

A. 648. Yes, we had to change the hook-up a little bit.

X-Q. 649. And that hook-up was changed by you when the oil burner was installed?

A. 649. Yes, sir.

X-Q. 650. And are you willing to state here now that no changes have been made?

A. 650. To my knowledge, no.

X-Q. 651. Might some of your service men have done some service work in connection with the Church hook-up?

A. 651. They might have, but I definitely know there has not been.

X-Q. 652. By "hook-up," you mean wiring circuit?

A. 652. Yes, that is right.

X-Q. 653. When did you last work on the Church hook-up?

A. 653. When the original fan control was changed to a later type; it seems to me that was about 1930 when that was put in. I do not recall the exact year but it was some time after the original installation.

X-Q. 654. Did you change the hand switch at that time?

A. 654. No.

X-Q. 655. Did you change the wiring for the hand switch at that time?

A. 655. No, sir.

X-Q. 656. Or when you were at the Church last
1129 Thursday in company with Mr. McCabe?

A. 656. The last time when I changed the furnace switch was in 1930.

X-Q. 657. Has there been service work done since then?

A. 657. On the oil burner, but not electrically; no.

X-Q. 658. If a control has to be changed, does that come under the classification of electric work, or is it service work?

A. 658. Depending upon the kind of a control. If it does

not require any changes, the ordinary service man can do it.

X-Q. 659. So if a thermostat was to be substituted, a service man could make the change?

A. 659. Yes.

X-Q. 660. And if a limit control was to be substituted, the service man could do it?

A. 660. If it was the exact type he was replacing, yes.

X-Q. 661. And the same is true of a stack switch or a fan switch?

A. 661. That is right.

1130 And on, to wit, the 20th day of May, A. D. 1942, came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Deposition of McCabe and Courteol, M. H. EX. 32, in words and figures following, to wit:

Filed May 20, 1942

1131 Q. 1. Will you please state your name, residence, and present occupation?

A. 1. Ira E. McCabe; residence, Chicago, Illinois; I am an inventor and engineer, conducting my own business.

Q. 2. That is, conducting your own business apart from The Mercoid Corporation?

A. 2. Yes.

Q. 3. Just what is your connection with The Mercoid Corporation?

A. 3. I have a license agreement entered into in September, 1921, and have operated under that since that time.

Q. 4. Are you an Officer of The Mercoid Corporation?

A. 4. I am a Director of the Company.

Q. 5. And how long have you been a Director of that Company?

A. 5. I do not remember exactly.

Q. 6. Approximately?

A. 6. It is several years; I can ascertain that, but I don't remember it definitely.

Q. 7. And, I take it, being a Director, that you are
1132 likewise a stockholder in that Corporation, are you not?

A. 7. Yes.

1133 Q. 15. Are you acquainted with the business of The Mercoid Corporation?

A. 15. Yes.

Q. 16. And where do you carry on your business?

A. 16. I have space in the plant of The Mercoid Corporation.

Q. 17. And do you have people employed by you that assist you?

A. 17. Yes.

Q. 18. They are under your direct supervision?

A. 18. Yes, and on my payroll.

Q. 19. Do you in your business, carry on for any company other than The Mercoid Corporation?

A. 19. Well, I carry on for myself, and I may at times do things that are outside of the Mercoid's contract.

Q. 20. Now, when it comes to controls, does Mercoid get first call on whatever development work you do in that direction?

A. 20. Yes, they have the exclusive rights in those
1134 fields—pressure acting and thermostatic apparatus.

Q. 21. And I take it that the business of the Federal Gauge Company, the predecessor of the present The Mercoid Corporation, was carried on very much as the present The Mercoid Corporation carries on its business?

A. 21. Yes.

Q. 28. Do you have anything to do with the type and kind of devices actually put on the market by The Mercoid Corporation?

1135 A. 28. Well, we usually develop those devices in our department.

Q. 29. And when you say, "Develop them in your department," that means that you bring them up to a condition where the item is a salable and commercial item?

A. 29. Yes.

Q. 30. You do, as I understand it, all of the research and experimental work from the inception of a device up to the time it is ready to go into plant production.

A. 30. Yes, and we also follow its performance, and production, where it is necessary, that is, where we are involved.

Q. 31. That is, even when you bring a device to Mercoid, after it has gone through your department, or work shop, so to speak, you then follow it through The Mercoid Corporation to see that it is made in accordance with—

A. 31. (Interrupting) With our drawings.

Q. 32. Then, I take it, also, that you—and when I say, "you," I mean you and your associates—actually make the

necessary working drawings that have to do with the controls that you turn over to Mercoid?

A. 32. Yes.

Q. 33. And do these drawings include layout drawings, as we understand them, that is, wiring diagrams, or circuit drawings?

A. 33. Well, they will include some; of course, we
1136 do not make all of those in our department.

Q. 34. You do make necessary circuit drawings, that is, those that are necessary for a full understanding of the operation of the particular control that you are about to turn over to The Mercoid Corporation?

A. 34. We do not make all of them.

Q. 35. You make some of them?

A. 35. We make some.

Q. 36. You make enough so that you have a full understanding, and likewise, you can pass on to the officers and executives of The Mercoid Corporation, sufficient information so that they know just what the control is intended to do?

By the Witness: May I have that question again?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 36. It is not always possible to give them full information, because a control can do a great many things; that is, most of these controls have a great variety of uses, and their application has become quite extended.

By Mr. Freeman:

Q. 37. And when you turn a control over to The Mercoid Corporation, do you in a general way check with the Company as to the many applications that the con-
1137 trol may be used for?

A. 37. Well, we generally determine whether there is a market, and try to fill the market with the product.

Q. 38. In other words, if there is a market for particular type of control, it is your job to see if you can make a control to fill that market?

A. 38. Generally speaking.

Q. 39. And that control, when made up, goes to The Mercoid Corporation?

A. 39. They have the option of taking, or refusing it, in accordance with the agreement.

Q. 40. Isn't it a fact that your business which you con-

duct in the Mercoid plant, really acts or serves The Mercoid Corporation as an engineering department?

A. 40. As far as production is concerned.

Q. 41. Does The Mercoid Corporation have—?

A. 41. (Continuing) Production of instruments—I mean in the development of instruments, but they also have engineers in their employ who assist the trade in applying them.

Q. 42. That last type of engineer is sometimes known in the trade as a sales engineer?

A. 42. More or less; many of them are graduate engineers.

Q. 43. But in the selling end of the business as distinguished from the manufacturing or production end?

A. 43. Yes.

1138 Q. 44. Now, does The Mercoid Corporation have an Engineering Department other than what assistance you give Mercoid, that is engaged in production or development engineering?

A. 44. No.

Q. 45. Now, when a control or controls are sold, and trouble arises, do the executives or sales engineers of The Mercoid Corporation confer with you and your associates as to the trouble??

A. 45. Yes.

Q. 46. And that continues long after you have done the original engineering and turned the instrument over for production or manufacture, to The Mercoid Corporation?

A. 46. Yes.

Q. 47. I take it that you have taken out a great many patents?

A. 47. The record will show that.

Q. 48. Might you just give us a rough guess of the number you have taken out?

A. 48. Well, last year I know it was over a hundred; I do not have the exact number at hand.

Q. 49. And you have continued to take patents out for some fifteen or twenty years?

A. 49. Well, Mr. Moore took my first application in 1913.

Q. 50. You are, then, generally acquainted with the various controls and types of controls made by The

1139 Mercoid Corporation?

A. 50. Yes.

Q. 51. The Mercoid Corporation manufactures a con-

trol known as a combination fan and limit control, does it not?

A. 51. Yes.

Q. 52. And I take it that the design, that is, the actual get-up of that control was made in your department?

A. 52. It was.

Q. 53. And under your supervision?

A. 53. It was.

Q. 54. I have a control here which, for convenience, we will mark, "M-H Exhibit 1," and will ask you to state whether or not it is a combination fan and limit control of the kind made by The Mercoid Corporation?

A. 54. Yes, it is Type M-80, Serial Number M 234309.

Q. 55. Now, the combination fan and limit control that you have just identified as Mercoid Type M-80, is used for the controlling of electric circuits?

A. 55. It is.

1140 Q. 58. And have you seen combination fan and limit switches, such as M-H Exhibit 1, actually used in a furnace?

A. 58. I have seen installations where one was mounted.

Q. 59. And in such installation, the helix, which is the bimetal element—

A. 59. Yes.

Q. 60. (Continuing)—and a portion of the tube was actually projected into the bonnet of a furnace?

A. 60. Yes.

Q. 61. And in the case where you saw a device like M-H Exhibit 1 in a furnace, it was there used for controlling the operation of the furnace, was it not?

A. 61. It was used to—I did not inspect the par-
1141 ticular wiring diagram, but it was part of the furnace system, so—

Q. 62. Do I understand that you did not inspect the wiring diagram?

A. 62. Not in the particular installation.

Q. 63. You knew, however, that the instrument like M-H Exhibit 1 was actually connected up with electric wires?

A. 63. It was connected; but at the time I did not examine the wiring to know which arrangement was used.

Q. 64. The furnace which you saw, you knew it was a warm air furnace?

A. 64. Yes. I might say here, that the most of those I have seen have been in shows—and the exhibits will have one of the devices on.

Q. 65. And at those shows, did you take occasion to check the wiring diagrams, as to the manner or arrangement of the connections?

A. 65. No, because there are several ways in which they can be hooked up, and I had no occasion to be inspecting the exact layout they made use of.

Q. 66. And I take it, you are familiar with the several ways that they can be hooked up?

A. 66. Yes, I am; and there are probably many that I would not be.

Q. 67. And I take it, also, that you are familiar with the two ways Mercoid recommend the hook up, as shown
1142 on Mercoid Bulletin L-4, entitled, "Installation Instructions," are you not (handing document to witness)?

A. 67. Yes, I am familiar with them.

Q. 68. And the installation instructions, particularly the two circuits shown on Bulletin L-4, have to do with instruments like M-H Exhibit 1; is that correct?

A. 68. The diagram can be used with this instrument, or with any particular—the diagram here is intended for use with the M-80.

Q. 69. And you know, as a matter of fact, that the Bulletin L-4 is actually sent out, or packed in the carton containing a physical device like M-H Exhibit 1 when it leaves the Mercoid plant, do you not?

A. 69. It is supposed to be included.

Q. 70. That is, you know that a Bulletin like L-4 is actually intended to go out with each M-80?

A. 70. That is right.

1143 Q. 84. And when you made up devices like M-H Exhibit 1, you knew that it was to be used for controlling the operation of a warm air furnace, did you not?

A. 84. I knew that it was to be used to consolidate the use of two separate controls which we have sold for many years.

Q. 85. Now Mr. McCabe, you knew, did you not, when you made up M-H Exhibit 1, that it was to be used in connection with the controlling of warm air furnaces?

A. 85. That is just what I said before, that it was to be used to take the place of installations of two separate controls; we have found that we could get them in one instrument and simplify the installation.

Q. 86. You knew that M H Exhibit 1, or devices like it,

were to be used for the controlling of warm air furnaces, did you not?

A. 86. I know we have been using them for many years.

Q. 87. Will you please answer my question?

1144 By the Witness:

A. 87. We have been using them for many years to control warm air furnaces—M-80 and devices like them.

By Mr. Freeman:

Q. 88. That is, M-80, which is M-H Exhibit 1, when made up by you was to be used for the controlling of warm air furnaces?

A. 88. That was one of its uses.

1145 Q. 94. I think you said something, Mr. McCabe, about two switches; and so that the record may be 1146 clear, the Mercoid M-80, M-H Exhibit 1, shows two switches, does it not?

A. 94. It has two switches actuated by one bimetal element; the two switches which I refer to are similar to those in M-51 and M-53, in which we have a fan control and a furnace—and a limit control, in separate cases.

Q. 95. We find, do we not, on M-H Exhibit 1, on the right-hand side as you look at the instrument, a limit switch?

A. 95. Yes, that would be similar to our M-51 in the single unit switch.

Q. 96. And likewise, on the lefthand side, as you look at the instrument M-H Exhibit 1, there is a fan switch?

A. 96. Yes, that would be similar to our M-53 in the single unit switch.

Q. 97. And as you have stated, the two switch members are operated from a single bimetallic element?

A. 97. Yes.

Q. 98. In M-80?

A. 98. In M-80, and by two separate ones in M-51 and M-53.

Q. 99. Now, if a customer wanted only a limit switch, he would not necessarily buy a device like your M-80, M-H Exhibit 1, would he?

A. 99. No, it would not be necessary; he would buy the M-51.

Q. 100. And likewise, if he wanted only a fan 1146 switch, he would not buy a device like M-H Exhibit 1?

A. 100. Not necessarily.

Q. 101. But if the customer wanted to have a limit switch and a fan switch for controlling a warm air furnace,

an instrument like M-H Exhibit 1 would serve his needs, would it not?

A. 101. Either the M-80, or an M-51 and an M-53 would meet his needs.

Q. 102. A device like M-H Exhibit 1 would serve his needs, would it not?

A. 102. It might.

Q. 103. Well, if the customer started out and wanted a fan control and a limit control, he could obtain from The Mercoid Corporation a device like M-H Exhibit 1, and that would answer his needs?

A. 103. Again, I say it might, because I would like to qualify that by knowing his requirements.

Q. 104. Well, his requirements—of this particular customer, would be to carry out in a complete installation the circuit arrangement as shown on your Bulletin L-4, M-H Exhibit 1-A, Illustration No. 7.

A. 104. It could be used to carry out that circuit.

Q. 105. And likewise, he could buy the instrument M-H Exhibit 1 for carrying out the circuit arrangement and furnace operation shown on Illustration No. 8 of M-H 1148 Exhibit 1-A, could he not?

A. 105. He could buy that, or he could buy M-51 and M-53.

Q. 106. If the customer wanted to buy an M-80, he could connect it up for carrying out furnace operations as shown on your Illustration No. 7, could he not?

A. 106. He could connect it up that way, or any way he wanted to.

Q. 107. And if he connected it up—

A. 107. (Interrupting) I could not control his—how he connected it.

Q. 108. And if he connected it up in accordance with the wiring diagram, Illustration No. 8 on M-H Exhibit 1-A, he could get proper operation of the control M-H Exhibit 1, could he not?

(Witness examines M-H Exhibit 1-A.)

By the Witness: Now let's see what he said?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 108. He could, if everything else in connection with it was arranged properly.

By Mr. Freeman:

Q. 109. And if he followed the instructions of M-H Ex-

hibit 1-A, your Bulletin L-4, he would get the proper furnace operation, would he not?

1149 A. 109. Again, if everything in connection with it was correctly laid out.

Q. 110. If all of the instruments were made in a proper and workmanlike manner, and the customer then connected up M-H Exhibit 1 fully in accordance with the circuit drawing Illustration No. 8 on Bulletin L-4, would he then get the kind of furnace operation as called for in your Bulletin L-4?

A. 110. If his furnace installation was properly made.

Q. 111. And he would then get the kind of furnace operation as recommended by The Mercoid Corporation in its Bulletin L-4?

A. 111. (Witness further examines M-H Exhibit 1-A.) I don't find recommendations here.

Q. 112. You do find a circuit drawing, do you not?

A. 112. I find a circuit drawing, yes.

Q. 113. And the control is set at the factory, is it not, so that when connected up in accordance with the circuit drawing appearing on Exhibit M-H 1-A, you would get the kind of furnace operation—

A. 113. (Interrupting.) The controls are not set at any particular place, at the factory.

Q. 114. Do you have a recommended setting?

A. 114. Under "ADJUSTMENT" it states,

"The instrument can now be adjusted to the de-

1150 sired operating points."

Q. 115. Do you find on the installation instructions, any suggested or recommended setting?

A. 115. It says (reading)

"The fan control is usually set about 120 degrees low to 150 degrees high. On the majority of warm air installations, using forced circulation, the limit switch is usually set to cut out at temperature between 200 and 250 degrees. The cut-in point is usually set at approximately 50 degrees below the cut-out point. There are, however, many installations in which this particular adjustment might be insufficient or excessive, therefore a careful study of each case must be made."

Q. 116. Have you ever seen any hook-ups—and by "hook-ups," I mean electrical hook-ups—wherein devices like M-H Exhibit 1 were actually connected up in accordance with Illustration No. 7 on M-H Exhibit 1-A?

By the Witness: Let me have that question again.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 116. By "devices like M-80," do you mean, like our M-51 or M-53 in separate combination, or do you mean, merely the M-80?

1151 Q. 117. I have reference to—

A. 117. (Interrupting) Do you wish to confine it to this particular instrument? That is what I am asking.

Q. 118. Yes, and by "this particular instrument" I have reference to M-H Exhibit 1.

A. 118. You are limiting that to the exact diagrams and illustrations, No. 7 and No. 8?

Q. 119. I limit it to Illustration No. 7.

A. 119. I cannot recall an actual installation at this time, made exactly in accordance with Illustration No. 7, including an M-80.

Q. 120. Do you recall an actual installation corresponding to the Illustration No. 8 on M-H Exhibit 1-A, wherein a device like M-H Exhibit 1 was used?

A. 120. I do not recall having inspected an installation of Illustration No. 8 utilizing an M-80 furnace control and the exact wiring; you see, we don't make installations, and I would have very little contact with them.

Q. 121. Do you make test installations in your plant, or in your Research Department?

A. 121. We have two or three boilers around there that we make use of.

Q. 122. Do you have some warm air furnaces?

A. 122. We have a warm air furnace, and a hot water and a steam furnace.

1152 Q. 123. And have you ever made tests of devices like M-H Exhibit 1 on your warm air furnace?

A. 123. Not personally; possibly some of my men have.

Q. 124. Do you know what the circuit arrangement was in those test installations you have just referred to?

A. 124. I would have to look up our records.

Q. 125. Would you say that devices like M-H Exhibit 1 were turned over by you to The Mercoid Corporation without complete test?

A. 125. No, they are tested.

Q. 126. And they are tested under practical operating conditions, are they not?

A. 126. Well, a device like M-80, we have been building our—we started with our Figure 50, back in 1923 or 1924,

when we made furnace limit controls and fan—booster fan controls, they were called then; and then we developed our M-51 and M-53; and when we came to consolidate them in the M-80, all the information and data as to the differential requirements was available from our experience, and tests may have been made of the differentials of each switch, and not necessarily would they have been put on a warm air furnace for that testing. We have equipment in the laboratory where we get our electric heat for obtaining differentials, and checks were made probably by comparison; we knew when we put an M-80 in operation how it
1153 would perform as against an M-51 or an M-53.

Q. 127. You would not put out any recommended circuit drawings for the installation of devices like M-H Exhibit 1 without actually knowing that the device would do the job that you intended it to do?

A. 127. Well, the circuits were the same as were used in the separate instruments; by that, I mean the arrangement of the M-80 would work anywhere where an M-51 and an M-53 could be used, and they have been used for a great many years; consequently, the replacing—or the placing of the M-80 in our line, as far as the diagrams were concerned, the substitution of the M-80 would mean merely the removing of the M-51 and the M-53 from the specifications and placing the M-80 in there.

Q. 128. Do you have any circuit drawings showing the separate use of the controls, showing the—I think you said, the M-51 and the M-53?

A. 128. Yes.

Q. 129. Wherein you get the identical sequence of operation that you get when M-H Exhibit 1 is conencted up in accordance with Illustration No. 7 of M-H Exhibit 1-A?

A. 129. What particular sequence of operation are you referring to?

Q. 130. To the same sequence of operation as you
1154 get when you use M-H Exhibit 1, connected up in accordance with Illustration No. 7, shown on M-H Exhibit 1-A.

A. 130. You are limiting this to the operation of the fan control? Or are you trying to include the oil burner or stoker control?

Q. 131. Well, take it for the control of a warm air furnace with an oil burner.

A. 131. In other words, you mean that—I want to put this so that I can see if I can find out what you are driving

at; you mean, when the limit control stops the burner, that the fan continues to run—stops the equipment—is that what you mean?

Q. 132. Is that the way Illustration No. 7 provides for the operation of the heating plant?

A. 132. Yes.

Q. 133. Then that is what I want.

A. 133. Well, I can have our records searched, and locate such information.

Q. 134. Will you do that?

A. 134. Yes.

By Mr. Moore: Will you read the question and answer?

(The record as above recorded was read by the Reporter.)

By Mr. Freeman:

Q. 135. I hand you your Bulletin P-55 A dated
1155 February, 1940, and call your attention to the drawing or circuit thereon, number 962, and will ask you whether or not it discloses two separate controls operating similar to the operation that would be obtained from a hook-up following Illustration No. 7 on M-H Exhibit 1-A?

By the Witness: Will you read the question again?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 135. There is a difference in that the limit control—let's see—wait a minute, now wait a minute: Which drawing did you refer to: No. 7? (Witness examines Bulletin P-55 A—hereinafter marked M-H Exhibit 1-B—and M-H Exhibit 1-A.) In this circuit the fan would operate in a similar manner.

By Mr. Freeman:

Q. 136. Now, will you produce the earliest drawings or bulletins wherein circuit installations corresponding to No. 962 on Bulletin P-55 A, are shown, where when the limit switch was in open circuit position the fan could and would continue to operate so long as the fan switch remained closed?

By the Witness: Will you read that again?

(The pending question as above recorded was read by the Reporter.)

1156 By the Witness:

A. 136. We will have our records searched, and produce such information.

By Mr. Moore: What is the answer?

(The record as above recorded was read.)

1157 Q. 143. I hand you a photostat of a drawing, which is an enlarged copy of Illustration No. 7 appearing on M-H Exhibit 1-A; (handing document to witness). Now will you just compare the photostat with the drawing?

A. 143. (Witness examines said photostat and M-H Exhibit 1-A.)

Q. 144. Do you find it to be an enlarged copy?

A. 144. It appears so.

By Mr. Freeman: The photostat of Illustration No. 7 is offered in evidence as M-H EXHIBIT 2.

(Said photostat was accordingly marked "M-H Exhibit 2" and made a part of this deposition.)

By Mr. Freeman:

Q. 145. Now, when the room is warm, the thermostat is usually off, is it not?

A. 145. Yes.

Q. 146. And likewise, the limit switch is closed?

A. 146. Yes.

Q. 147. And the fan switch is open?

A. 147. Let's see, now; let's have this again.

1158 (The question as above recorded was read by the Reporter.)

By the Witness:

A. 147. (Continuing). It depends upon the temperature of the furnace.

By Mr. Freeman:

Q. 148. Let us assume that the furnace is cold.

A. 148. If the furnace is cold, it would be off.

Q. 149. Now, I hand you a drawing marked M-H Exhibit 2-A, which is a photostat following closely M-H Exhibit 2, except we have some red and blue lines, and some typewritten matter on the lower portion of the photostat: Now Mr. McCabe, I would like to have you examine the photostat M-H Exhibit 2-A and compare it with the typewritten matter, and tell me whether or not the typewritten matter correctly specifies the condition of the various parts of the layout when the room is warm and the furnace is cold; incidentally, Mr. McCabe, we have used dotted lines showing wires which are not energized, and solid lines in color where wires are energized.

A. 149. Of course, I would have to qualify this: For instance, with a stoker control you may have this line (indicating) energized even with the thermostat cold.

Q. 150. How about an oil burner control?

A. 150. This would be, in the case of an oil burner 1159 it would be probably this way.

Q. 151. That is, the photostat M-H Exhibit 2-A correctly discloses the condition of the various parts when they are in what we call, "Position 1," that is, room warm and furnace cold.

A. 151. In accordance with my previous qualification, if it was a stoker control, you might have a circuit here (indicating) because there is another device in there that closes the burner—or the stoker circuit momentarily to hold the fire.

Q. 152. Limiting your answer to an oil burner control, Exhibit M-H 2-A is a correct representation?

A. 152. Yes.

Q. 153. Now I hand you another photostat, marked M-H Exhibit 2-B, with "Position 2" thereon, that is, room cold and furnace cold; would you then find the various elements of the system as specified on M-H Exhibit 2-B?

A. 153. Yes.

Q. 154. And in Position 2, the room thermostat is now calling for heat, so we have the blue lines of the drawing running on over to the oil burner motor?

A. 154. Yes.

Q. 155. Now, as the furnace warms up so that it goes from a cold condition to a warm condition, what change takes place in the operation of the heating plant with
1160 respect to the fan switch?

A. 155. The fan switch will close.

Q. 156. I now hand you a drawing marked M-H Exhibit 2-C, and will ask you if the descriptive matter on that drawing is correct now that the furnace is warmed up?

A. 156. That is correct.

Q. 157. That is, the fan switch has moved from open circuit position to closed circuit position?

A. 157. Yes.

Q. 158. And that was brought about, was it not, by the rise in bonnet temperature of the furnace?

A. 158. Correct.

Q. 159. Now, as the furnace continues to warm up so that it gets to a temperature that we might refer to as, hot, or above the setting of the limit control, what happens in such case?

A. 159. The burner is stopped.

Q. 160. What happens to the limit switch?

A. 160. It opens the circuit.

Q. 161. And in such case, the burner ceases to operate?

A. 161. That is right.

Q. 162. Now, I hand you a drawing marked M-H Exhibit 2-D, and will ask you to state whether or not it correctly discloses the condition of the various elements when the room thermostat still calls for heat but the furnace
1161 has attained a temperature higher than the cut-out point of the limit control?

By the Witness: May I have that question read?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 162. That is right.

By Mr. Freeman:

Q. 163. And in such case the fan circuit would still remain energized?

A. 163. It would.

Q. 164. And the burner motor would be off even though the room thermostat was still in closed position, demanding heat?

A. 164. It would run until the furnace cooled.

Q. 165. What would "run until the furnace cooled"?

A. 165. The fan motor would run until the furnace cooled.

Q. 166. And when the furnace cooled down, if the thermostat were still demanding heat, the limit control would kick in, or on, and again start the burner operating?

A. 166. It would, depending on the adjustment of it.

Q. 167. And by "adjustment of it," you mean temperature setting?

A. 167. Temperature setting.

Q. 168. And by "temperature setting," you mean
1162 the cut-in and cut-out points?

A. 168. Yes.

Q. 169. Now, assuming that the heating system, or warm air furnace is in the condition of the drawing M-H Exhibit 2-D, and then it cooled down so that instead of the furnace being hot, it returned to its warm condition, would the parts then assume the position shown on the drawing M-H Exhibit 2-E, "Position 5"?

A. 169. It would, with the proper setting of the instruments; in other words, those instruments can be adjusted so that it might be so, or it might not.

Q. 170. And by "proper setting," I have reference to where the limit control, due to the decrease in furnace tem-

perature, moves to "on," or closed circuit position; would you in such case go from the drawing M-H Exhibit 2-D, Position 4, to the drawing M-H Exhibit 2-E, Position 5?

By the Witness: Let's have that question again.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 170. If your setting was such that the limit control came back on before the fan control went off.

By Mr. Freeman:

Q. 171. And the furnace would so operate if the settings were made in accordance with the recommended set-
1163 tings shown on M-H Exhibit 1-A, your Bulletin L-4?

A. 171. Yes.

Q. 172. Now, looking at the drawing M-H Exhibit 2-E, and taking into consideration that the room thermostat has been satisfied, and moved to off, or open circuit position, would the parts then assume the position referred to in the drawing M-H Exhibit 2-F?

By Mr. Moore: Would you mind reading that question?

(The record as above recorded was read by the Reporter.)

By the Witness:

A. 172. Yes.

By Mr. Freeman:

Q. 173. What was your answer?

A. 173. "Yes."

Q. 174. And in such case the fan would continue to run, forcing hot air from the furnace into the room to be heated?

A. 174. Until such time as the furnace temperature dropped sufficiently to open the fan circuit.

Q. 175. But so long as the fan switch remained closed and the temperature of the furnace was higher than the cut-out point of the fan switch, the fan would continue to force the air, that is, the heated air from the furnace on up into the room?

1164 A. 175. Yes, that would run that way, of course, on one condition, with an oil burner, say, an oil or a gas burner—those type furnaces—it would be a very few seconds; but with a stoker or a coal fire, it would be longer, depending on the amount of heat stored in the furnace.

Q. 176. In other words the greater the amount of heat within the furnace the longer the fan switch will remain closed?

A. 176. Yes.

Q. 177. And the more heat will be forced up?

A. 177. Until you have used up that latent heat in the furnace; of course, the latent heat that was stored there, of course if the amount were small it would be but a few seconds; if it were large, it would take a longer period.

Q. 178. There is usually some heat stored in the furnace, even after the room thermostat is satisfied?

A. 178. Yes.

Q. 179. And that heat that is stored in the furnace, if you get it on up into the room, serves a useful purpose, does it not?

A. 179. Well, in some cases it is desirable to get rid of that; it depends on the installation: if it was a gas fired furnace, for instance, those types of furnace of a very small mass, the effect practically would hardly be noticed
1165 because the storage of what little heat was there is gone in a very short time; but with a heavy furnace, or, say, it was a—

Q. 180. (Interrupting) A stoker or coal fired furnace.

A. 180. (Continuing) —With a stoker or a coal fired furnace, or it might be one of those split systems where they make hot water or steam, and blow their hot air through a radiator over the furnace, and use the furnace for the hot water supply, and then use the radiation for supplying the warm air—in those types you have quite a storage of heat, and then it might be disadvantageous to have this operation; you might have a great deal of heat stored there even after the thermostat had cut off, and it would go on up and raise the temperature considerably higher.

Q. 181. It is better to get that heat into the room than to let it leak out from the furnace into the basement, isn't it?

A. 181. No always. I am pointing out the two methods you have with that type of warm air furnace when you are storing that heat; for instance, if it was a—I have known of a warm furnace where you find a hot water boiler and they use the water supply there, use the water in the home, you know, for bathing, and so forth, and for any general purposes and all; and in that case you would just as soon not run that fan and remove that heat out of the
1166 furnace, so you would shut it off, in that case it would be more desirable—in that case this form (indicating) would not be very useful.

Q. 182. But in such case where you did not want the fan

to run after the room thermostat moved to off circuit position, you would then make your hook-up in accordance with Illustration No. 8 appearing on M-H Exhibit 1-A, your Bulletin 1-4; is that correct?

A. 182. Yes, that would be a more desirable arrangement in that case.

Q. 183. That is, in Illustration No. 8, when the room thermostat moves to off circuit position, the fan circuit is interrupted even though the fan switch is still in closed circuit position?

A. 183. Yes, that is right.

Q. 184. Now, you referred to these drawings, M-H Exhibits 2 to 2-F as usable in an oil burner system; now, as a matter of fact, if you had the same circuit arrangement used in connection with a stoker, the only difference would be that the stoker would have a hold fire, and at regular intervals you would get a shot of coal to keep that fire from going out?

A. 184. Yes, that is right.

Q. 185. And so far as the various elements are concerned, you would find them in exactly the same ar-
1167 rangement as specified on drawings M-H Exhibits 2 to 2-F, inclusive?

By the Witness: May I have that question again?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 185. Yes.

By Mr. Freeman:

Q. 186. Now, I hand you a drawing marked M-H Exhibit 2-G which discloses a position following the drawing M-H Exhibit 2-F, and I ask you whether it correctly shows the condition of the various elements after the fan switch has moved to open circuit position, as the furnace goes from its warm condition to its cold condition?

A. 186. That is correct.

1168 Q. 187. Mr. McCabe, I hand you a drawing marked M-H Exhibit 3, and will ask you to compare it with Illustration No. 8 on M-H Exhibit 1-A.

1169 A. 187. (Witness examines said documents.) Yes, it looks like an enlargement of Illustration No. 8.

Q. 188. When the room is warm and the furnace is cold, the limit switch will be in closed circuit position; is that correct?

By the Witness: What was the question?

By Mr. Freeman: Read it.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 188. The furnace is cold? The room is warm, and the furnace is cold; is that it?

By Mr. Freeman:

Q. 189. Yes.

A. 189. Yes.

Q. 190. I hand you M-H Exhibit 3-A, and will ask you if the solid lines in red and blue show the electrical circuit when the room is warm and the furnace is cold.

(Witness examines said document.)

By the Witness: Now, what is the question?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 190. That would be the case, unless the stoker control had made a hold fire circuit.

1170 By Mr. Freeman:

Q. 191. And the stoker control for the hold fire circuit, that is independent of what we have here?

A. 191. Yes, but this circuit could be closed if there was a call for operation maintaining the fire in the stoker.

Q. 192. So far as the stoker hold fire, that is a timer device?

A. 192. Yes.

Q. 193. Independent from the demands on the part of the room thermostat?

A. 193. Yes.

Q. 194. Or the position of the room thermostat?

A. 194. Yes. That is one of the models that would be subject to that temperature, by the way, the Stokatherm.

Q. 195. That is, whether it is a timer device?

A. 195. Yes.

Q. 196. In case it operates as a result of stack temperature?

A. 196. Well, it operates as the result of the fuel or stack temperature, as the timer device, then makes the circuit, and in the other case it is the timer.

Q. 197. In connection with stokers there is a desire to keep the fire from going out?

1171 A. 197. That is right.

Q. 198. And so you provide what is sometimes

known as a hold fire circuit or control by which you get a shot of coal?

A. 198. Yes.

Q. 199. Into the fire, to keep it from going out?

A. 199. That is right.

Q. 200. And in such case, in connection with the stoker, you get that shot of coal whether or not the room thermostat is demanding heat?

A. 200. That is right.

Q. 201. Then so far as the room thermostat and the other parts shown on M-H Exhibit 3-A are concerned, they do correctly represent the installation?

A. 201. That would be right.

Q. 202. And the parts would be in the position enumerated in the typewritten matter on the lower part of the drawing?

A. 202. That is right.

Q. 203. Now, upon a demand for heat, and the closing of the room thermostat, you would then get burner, or motor operation in accordance with the drawing I have handed you, marked M-H Exhibit 3-B; is that correct?

(Witness examines M-H Exhibit 3-B.)

By the Witness: Let's see, now, may I have that question?

1172 (The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 203. Yes.

By Mr. Freeman:

Q. 204. And in such case the fan switch would be open, and the fan would be off?

A. 204. It would remain off unless the furnace became hot—until the furnace became hot enough.

Q. 205. Then in accordance with the description on M-H Exhibit 3-B, with the furnace cold the fan switch would be open?

A. 205. Yes.

Q. 206. Now, as the furnace warms up so that it goes from its cold condition to a warm condition, that is, reaches a temperature at or above the setting of the fan switch, would you then get operation of the fan—and you might refer to M-H Exhibit 3-C in such case (handing document to witness)?

A. 206. Yes, that is correct.

Q. 207. And in such case, the green lines indicate the

energized electrical circuit controlled by the fan switch for operating the fan motor?

A. 207. Yes.

1173 Q. 208. And in the drawing M-H Exhibit 3-C, while the room is still cold, or not satisfied, and the furnace has attained a warm condition, we have both the fan and limit switches in closed circuit position?

A. 208 That is right.

Q. 209. Now, as the furnace continues to get hot, or passes beyond the warm stage and goes to what we call the hot condition, or at a temperature above the setting of the limit switch, and the limit switch then moves to open circuit position, would the parts then assume the position shown on M-H Exhibit 3-D? (Handing document to witness.)

A. 209 Yes.

Q. 210. And the kicking out, or opening of the limit switch would not interfere with the fan switch?

A. 210. No.

Q. 211. And the fan would continue to operate?

A. 211. Yes.

Q. 212. Even though the furnace, or the stoker motor had ceased to operate?

A. 212. Yes, as long as the furnace was hot.

Q. 213. And as long as the furnace was hot, the fan would continue to force the heating medium to the room to be heated?

A. 213. Yes.

Q. 214. Now, going from the hot position of the furnace where the limit switch is in open circuit position, and
1174 having the furnace cooled down, you again cause the limit switch to assume a closed circuit position; is that correct?

A. 214. Provided the adjustment is made.

Q. 215. Taking the adjustment as recommended by The Mercoid Corporation in its Bulletin L-4, M-H Exhibit 1-A, as the setting?

A. 215. Yes.

Q. 216. And in such case, taking the setting as recommended by The Mercoid Corporation, the limit switch would move to closed circuit position, and the fan would still continue to run?

A. 216. That is right.

Q. 217. And when the limit switch moved to closed circuit position, you would then again get the burner motor to operate?

A. 217. Or stoker motor.

Q. 218. Or stoker motor?

A. 218. Yes.

Q. 219. And in such case the parts would assume the position shown on M-H Exhibit 3-E; is that correct? (Handing document to witness.).

A. 219. Yes.

Q. 220. Then when the room thermostat becomes satisfied, and moves to open circuit position, would you then have the parts in the position shown in M-H Exhibit 1175 3-F?

A. 220. Yes, unless the stoker called for a hold fire operation.

Q. 221. But as far as the operation being controlled by the thermostat, the parts shown in the drawing M-H Exhibit 3-F are correct?

A. 221. Yes.

Q. 222. And in such case the fan switch is still in closed circuit position; is that correct?

A. 222. It is.

Q. 223. However, the thermostat having moved to open circuit position, prevents any electrical energy from energizing the circuit having the fan switch therein?

By the Witness: Let's get that question again.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 223. That is right.

By Mr. Freeman:

Q. 224. Then when the furnace temperature cools down, the fan switch moves from its closed circuit position, as shown on M-H Exhibit 3-F, and assumes the position shown upon M-H Exhibit 3-G; is that correct? (Handing document to witness.)

1176 A. 224. Yes, unless the stoker should call for a hold fire.

Q. 225. However, aside from the stoker-hold fire control, the apparatus shown and referred to on M-H Exhibit 3-G, is correct?

A. 225. Yes.

Q. 226. Now, the difference, as I understand it, between your Illustration No. 7 and your Illustration No. 8, or between the circuit of M-H Exhibits 2 to 2-G, inclusive, and M-H Exhibits 3 to 3-G, inclusive, resides in the fact that in M-H Exhibits 3 to 3-G, inclusive, the thermostat, when it

moves to open circuit position, causes the fan to cease operating even though the fan switch is in closed circuit position?

By the Witness: May I have the question again?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 226. Yes.

1177 Q. 270. Mr. McCabe, I hand you Bulletin M-12, and will ask you whether or not the circuit drawings thereon shown, likewise operate in accordance with the arrangement shown on M-H Exhibits 2 to 2-G, inclusive? (Handing document to witness.)

A. 270. (Witness examines said document.)

Q. 271. Perhaps I can ask you another question that will save some time: In the drawings of Bulletin M-12, when the limit-switch moves to open circuit position, the fan can still run, provided the fan switch is in closed circuit position?

A. 271. Wait a minute. (Witness examines said document.) The illustration on the left in the Bulletin M-12 is similar to Illustration No. 7 on Form L-4; and the drawing on the righthand side of Bulletin M-12 is the same as Illustration No. 8; the drawing in the center involves a damper motor for hand fired warm air furnaces, and the fan motor is shown wired independently of the damper control system.

Q. 272. Now, to make the matter clear, when the limit switch interrupts the operation of the burner motor, the fan can still continue to operate, as shown on the Bulletin M-12?

A. 272 Which one are you referring to? You see, I referred to three of them.

1178 Q. 273. Will you point out any drawing wherein the fan is not able to run when the limit switch has moved to open circuit position?

A. 273. The fan will run, in all drawings, when the limit switch is open.

Q. 274. And the circuit drawings Nos. 5, 6 and 7, illustrated on your Catalog No. 300, and likewise on your Catalog No. 400, likewise provide for the limit control to shut down the burner while permitting the fan to operate, provided the fan switch is in closed position; is that correct?

(Witness examines said documents.)

By the Witness: Will you read the question?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 274. I will describe the operation of each of these diagrams: Drawing No. 5 shows a warm air furnace system in which the fan is operated at two speeds; two stages of temperature control are employed—

By Mr. Freeman:

Q. 275. (Interrupting) Mr. McCabe, might we not save time if you would merely tell us whether or not in these drawings when the limit switch moves to open circuit position, the fan can still continue to operate, provided
1179 the fan switch is in closed circuit position?

A. 275. Well, in one of these drawings there are some differences, and in your question you don't bring that out, and I want to point out that in one of these circuits with the two stages here, the fan can be turned on and off independently of limit control and independently of burner operation, by a thermostat circuit; and I don't want anyone to be confused as to the fact that it is similar, unless you are maintaining that the crux of this thing is running a fan after the limit control opens the circuit.

Q. 276. I am just asking you—

A. 276. (Interrupting) I want to clear this up; you are asking me a question, and I started in to answer: One of these drawings here shows multiple stages of operation, in which the fan control is turned on and off independently of the burner operation, by the thermostat, although the thermostat is still calling for heat from the burner.

Q. 277. But even in such case, where you talk about a multiple stage fan, that is what we sometimes call two speed?

A. 277. No, in one of the cases it has two stages here—that is what I want to point out, in one case—two stages, in which you vary your heat, and the other you can ope-
1180 rate the fan off and on by the thermostat control regardless of the burner circuit.

Q. 278. But Mr. McCabe, take the three drawings on the two Bulletins, Drawings 5, 6 and 7, and point out which drawings illustrate circuit arrangements which permit the fan to run after the limit control has moved to open circuit position without regard to any other extraneous controls for the fan circuit.

A. 278. I am trying to point out to you that in this third drawing there are two stages, and the fan operates by the

thermostat, and not by the limit control under certain conditions; that is, if the room thermostat has gone up far enough, the thermostat shuts off the fan.

Q. 279. Is there any circuit drawings among the three drawings that we have referred to as Drawings 5, 6 and 7, where when the limit control moves to open circuit position it interrupts the operation of the fan?

A. 279. No, the limit control does not.

Q. 280. So in all three cases the fan continues to run even though the limit control has moved to open circuit position?

(Witness examines said drawings.)

By the Witness: Let's have that question again.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

1181 A. 280. Yes, if the room temperature is low—if the thermostat is still calling for heat.

By Mr. Freeman:

Q. 281. And in each case the fan switch is electrically independent of the limit switch?

A. 281. Yes.

Q. 282. Now, will you turn to your Catalog H-5, Drawing No. 748, and compare said drawing with the enlarged photostat that I hand you marked M-H Exhibit 5? (Handing document to witness.)

A. 282. (Witness examines said documents.)

Q. 283. Do you find the phtostat to correspond with Drawing 748 on Catalog H-5?

A. 283. Yes.

Q. 284. And when the room is warm and the furnace cold, the parts will be in the position shown in Drawing 5-A; is that correct? (Handing document to witness.)

A. 284. Yes.

Q. 285. Mr. McCabe, I note upon these drawings, "Mercoid Boiler Control"; might we correctly refer to the "boiler control" as a limit control?

A. 285. It depends; there are several types of controls—boiler control, it means in our case that it may mean a steam boiler job which was to be used with air ducts above it—with radiation above it, or it might mean a hot water boiler, or it might mean—

1182 Q. 286. (Interrupting) All I want to get at, is to have the record clear that the term "boiler con-

trol" might equally, or as well be referred to as a limit control.

A. 286. Yes. It would depend upon the type of furnace that we were using with this layout; it might be, as I say, a steam boiler in which you had radiators on which you were blowing air, or it might be a hot water boiler, or it might be a warm air furnace type of boiler, or furnace in which you produce the heat from the furnace direct.

Q. 287. And if you used, or had a warm air furnace installation we could rightfully refer to the "Mercoid Boiler Control" as a limit control?

A. 287. That would be what you would call it, yes.

Q. 288. And the Mercoid furnace control referred to on the Drawing 5-A might be definitely referred to as a Mercoid furnace fan control; is that correct?

A. 288. It might be a fan control, it might be, there are various types of these instruments used; you can go back in this catalog—what year was that catalog?

Q. 289. 1929.

By Mr. Moore: Do you want that catalog?

By the Witness: I just wanted to get the year.

By Mr. Moore: 1929.

1183 By the Witness:

A. 289. (Continuing) Yes. There were along at that time some people who had used our riserthern instrument that they put against the duct for the same work, before this other control became available they used what was known as the Figure 50, or this riserthern, or a similar one for that purpose.

By Mr. Freeman:

Q. 290. The term, "furnace control" is the control that actually starts and stops the operation of the furnace fan?

A. 290. Yes.

Q. 291. And the drawing No. 748 has to do with a warm air furnace fan?

A. 294. You see, there were two types in the catalog at that time.

Q. 292. Yes.

A. 292. When I refer to these I have to position myself with reference to time. It might have meant one of these (indicating), or one of these (indicating), 1050, or might have been the Figure 50, or it might have been the Figure 35, or it might have been some of the 848 models.

Q. 293. Regardless of the particular model, the term, "furnace control" as shown on the Drawing M H Exhibit

5, has to do with the starting and stopping of the operation?

1184 A. 293. Of a fan.

Q. 294. Of a fan?

A. 294. Yes.

Q. 295. That is correct?

A. 295. Yes; it might have been better to put it, "fan control", but that is the way it is designated there.

Q. 296. When the parts are in the position as referred to in the Drawing M-H Exhibit 5-A, the limit control ("Boiler Control") is in closed circuit position, and the furnace control ("Fan Control") is in open circuit position; is that correct?

A. 296. That is correct.

Q. 297. And the description as to the position of the parts appearing on Drawing M-H Exhibit 5-A, is correct?

A. 297. Yes.

Q. 298. Now, as the room thermostat moves to closed circuit position upon the demand for heat, we will then find that the circuit passes through the limit switch and through the thermostat so that the motor then is energized, is that correct; and does Drawing M-H Exhibit 5-B correctly illustrates the position of the various elements when the room thermostat first demands heat?

A. 298. Yes, that is correct.

Q. 299. Now, as the furnace goes from its cold position to its warm position and reaches the temperature
1185 wherein the fan switch moves to closed circuit position, you then get fan operation; is that correct?

A. 299. Yes. In this position the furnace control completes a circuit to a relay, and the relay energizes the fan. These installations were of the type of which I told you this morning, requiring a larger unit than normally found, that is, the motor was too heavy for the furnace control to handle directly so we had a relay interposed.

Q. 300. However, when the furnace warms up, the fan switch moves to closed circuit position, energizing the relay?

A. 300. Yes.

Q. 301. Which in turn brings on the operation of the fan?

A. 301. That is correct.

Q. 302. And for all practical purposes, we have a situation where upon the closing of the furnace control, the fan is energized?

A. 302. That is right.

Q. 303. In this particular case, you happen to do it through a relay?

A. 303. Yes, that is right.

Q. 304. As the furnace continues to warm up and goes from what we call a warm condition, to a hot condition, or reaches a temperature where the limit switch moves to open circuit position, will the fan in such case continue to
1186 run?

A. 304. Not in this case.

Q. 305. That is, looking at Drawing M-H Exhibit 5-C, when the limit switch moves to open circuit position, the fan circuit is interrupted?

A. 305. That is correct.

Q. 306. And the fan does not then operate?

A. 306. That is right.

Q. 307. And that would be true even though the room thermostat was in closed circuit position, demanding heat?

A. 307. Yes.

Q. 308. I now hand you drawing marked M-H Exhibit 5-D, and will ask you if the parts thereon shown correctly represent the position of the parts when the limit switch has moved to open circuit position, even though the room thermostat is demanding heat (handing document to witness)?

A. 308. That is right.

Q. 309. And assuming now that the hot condition of the furnace has corrected itself and the temperature has gone down to where the furnace is warm and the limit control again has moved to closed circuit position, will the parts then assume the position shown in M-H Exhibit 5-E? (Handing document to witness.)

1187 A. 309. Yes.

Q. 310. And in such case when the limit control re-establishes its circuit, the fan circuit is likewise re-established?

A. 310. Yes.

Q. 311. And then when the room gets warm so that the thermostat moves to open circuit position, will the parts of the installation assume the position as shown on the Drawing M-H Exhibit 5-F? (Handing document to witness.)

A. 311. That is correct, yes.

Q. 312. And in the Drawing M-H Exhibit 5-F, the fan control switch is in closed circuit position?

A. 312. Yes.

Q. 313. I now hand you the drawing marked M-H Exhibit 5-G, and will ask you if it correctly represents the position of the various parts when the furnace goes from its warm position to its cold position? (Handing document to witness.)

A. 313. Yes, that is correct.

Q. 314. In Drawing M-H Exhibit 5-D, the thermostat is still demanding heat, is it not?

A. 314. Yes.

Q. 315. And in that case the burner has been interrupted in its operation as a result of the limit control moving to open circuit position?

1188 A. 315. Yes.

Q. 316. And as a result of the limit control moving to open circuit position, it has interrupted the circuit to the fan motor even though the fan switch of itself is in closed circuit position?

A. 316. Yes, in this circuit the fan control is tied in with the limit and thermostat controls and it is not a separate booster fan circuit as was shown in the other drawing referred to earlier.

Q. 317. And in Drawings 5 to 5-G, inclusive, the operation of the fan is dependent upon the position of the limit control?

A. 317. And the thermostat.

Q. 318. And when the limit control moves to open circuit position, regardless of the position of the fan switch, the fan will interrupt its operation?

A. 318. That is right.

Q. 319. And that is true even though there is a quantity of heat in the furnace after the limit switch has moved to open circuit position?

A. 319. That is right. There is very little heat stored in a warm air, or in an oil burner type of furnace.

Q. 320. Whatever heat there is that brought about the opening of the limit control switch, that heat will have to dissipate itself before the limit switch moves to closed

1189 circuit position?

A. 320. Yes—well, in many of the warm air furnaces, you know the circulation—it is the natural circulation that would occur rather than fan circulation, that is, it would not be the force of the fan, it does not mean that that circulation proceeds into the room, it gradually proceeds up through the ducts into the room, but it won't go

with the same velocity; and that is one of the reasons this was arranged that way, in order to give the burner a longer period of operation at that time, that is with the furnace controls at a fairly close differential, and when the burner is shut off the fan pulled the temperature down quite rapidly; and from a burner operation standpoint we decided to give a longer cycle between operations when it did go off on the limit, and by shutting off the fan we allowed the natural draft and natural circulation to occur, and that took longer than it would on fan circulation, and gives a longer rest period between cycles, preventing short cycles of the burner; and the controls at that time or prior to that year did not have an adjustment differential; we had a fixed differential, and in some cases that differential was so close that the burner shut off in about ten or fifteen seconds, and turned on again.

Q. 321. Your present controls for controlling the operation of a fan, and the circuit drawings you send
1190 along with your control M-80 provides for fan operation as distinguished from gravity operation?

A. 321. It can be wired that way; it could be wired this way.

Q. 322. Do you find any circuit drawings that you send out with your control M-80, Exhibit M-H 1, wherein Mercoid recommends wiring the M-80 in accordance with the wiring layout of Exhibit M-H 5?

A. 322. I could not tell you, because there are special instruments made that call for different diagrams—whether they are going out with it, I can inquire and find out for you.

Q. 323. Do you know whether or not wring diagrams wherein the limit switch controls the operation of the fan, have ever been sent out by The Mercoid Corporation with controls corresponding to M-H Exhibit 1?

A. 323. I don't know.

Q. 324. You do not find upon the Installation Bulletin I-4, M-H Exhibit I-A, any circuit layout where the limit switch controlled the operation of the fan switch, or fan?

A. 324. (Witness examines M-H Exhibit I-A.) There are only two diagrams shown on this particular bulletin.

Q. 325. Now, will you find out and tell us if at any time since Mercoid began making instruments corresponding to M-H Exhibit 1, if it sent out wring diagrams, or
1191 furnished wiring diagrams to the trade wherein the limit switch controlled the operation of the fan?

A. 325. I will have to find out for you.

Q. 326. You don't recall ever seeing such diagrams in connection with M-H Exhibit 1?

A. 326. I am not sure if we have or not; I will have to find out.

Q. 327. When did you first see a Mercoid combination fan and limit control like M-H Exhibit 1 installed in accordance with the layout of M-H Exhibit 2—and by "installation" I refer either to an actual installation or a test installation?

A. 327. I saw them at conventions.

Q. 328. And were those Mercoid Conventions, to demonstrate to distributors at those conventions?

A. 328. Yes, it might have been somewhere that we were not—I go to a lot of shows over the country, and call on customers—I can't tell you.

Q. 329. At those conventions where you saw an installation employing M-H Exhibit 1 connected up like M-H Exhibit 2, did you there observe the operation of the combination fan and limit control?

A. 329. I didn't even examine the wiring; you are saying "connected up," I don't know even how they were connected up; to get that you would have to test your 1192 whole circuit down through, and I didn't do that in every case.

Q. 330. Have you ever seen devices like M-H Exhibit 1 connected up corresponding to M-H Exhibit 2, at the Mercoid plant for demonstration purposes?

A. 330. No, we have never set up a warm air furnace; I have seen them operated on ovens there at the plant, but I don't remember of seeing any field installation myself where I would have an opportunity to check wiring.

By Mr. Freeman: We offer in evidence the drawings marked M-H Exhibits 5 to 5-G, inclusive, as M-H EXHIBITS 5 TO 5-G, inclusive.

(Said documents were accordingly marked, respectively, M-H Exhibits 5, and 5-A to 5-G, inclusive, and made a part of this deposition.)

By Mr. Freeman:

Q. 331. Have you ever had occasion to call on the trade in connection with sales engineering work?

A. 331. Yes.

Q. 332. And have you called on warm air furnace manufacturers?

A. 332. Yes.

Q. 333. And have you endeavored to sell, or assist in the sale of controls like M-H Exhibit 1, to warm air furnace companies?

A. 333. I am usually called in where they want to
1193 get a certain layout, but I couldn't tell you about the prices, and I haven't done the selling; it is always up to the Sales Department for that.

Q. 334. You have been called in in connection with proper methods of installation of the control which Mercoid was then seeking to sell?

A. 334. Not in that way; I have been called in where a customer wanted us to make a special model, and I have sat in with them; but actually in the selling of that instrument, I haven't done the selling; I have been shown them at conventions, people have asked me about it, and I would describe it to them.

Q. 335. And when you described the operation of the control M-H Exhibit 1, did you point out the electrical circuit arrangement for the control?

A. 335. No.

Q. 336. You never have?

A. 336. No. It is a control like we have, the circuits are old, and have been used for many years; they know what a furnace control is, and what a fan control is, so that the circuits are not talked about; if a man wants a special circuit of any kind, he will write a letter in, and I will refer it to one of the boys, and have them make a diagram to meet their problem.

Q. 337. Have you ever called upon the Lennox
1194 Furnace Company of Marshalltown, Iowa?

A. 337. Yes, I have called on them.

Q. 338. And have you called on them in connection with the sale of devices like M-H Exhibit 1?

A. 338. Well, the sale of our line; it was probably mentioned along with the others.

Q. 339. Do you want to tell us now that you did not explain to the Lennox Furnace Company the electrical circuit layout of M-H Exhibit 2 for use in connection with M-H Exhibit 1 at that time?

A. 339. It is very rarely you discuss wiring diagrams; we have been selling controls so many years—if you go back a good many years, why you probably discussed wiring diagrams with a good many people, but that does not generally come up.

Q. 340. Do you want to tell us here that you did not

explain to the Lennox Furnace Company that with the hook-up of M-H Exhibit 1, your control Type M-80, you could get fan operation even though the limit switch moved to open circuit position?

A. 340. I don't remember what I discussed with the Lennox Furnace—if you want to know.

Q. 341. Would you want to say that you did not discuss with them the operation of your control, Type M-80, as to the limit control moving to open circuit position 1195 and the fan continuing to run?

A. 341. I couldn't tell you; I don't remember.

Q. 342. Who was with you on your last trip to the Lennox Furnace Company?

A. 342. My last trip? I can't tell you that; I remember—if I am right as to the last trip, I was on my way to Omaha, and stopped in there and—now, I don't know whether there was another trip since then; my aunt was sick in Omaha, and I was on my way there, as a matter of fact I didn't get there in time—my brother was with me, and my wife.

Q. 343. Now, isn't it a fact that you assisted, or at least supervised an installation of your Type M 80 at the Lennox Furnace Company?

A. 343. I did not work there, that I remember.

Q. 344. What is that?

A. 344. I did not do any installation work there that I remember.

Q. 345. I don't mean where you actually did the mechanical work of installation, but where the installation was put in, and you were there and watched it, or observed it, and had occasion to instruct others as to the making of the installation.

A. 345. I can have our reports looked up, but I can't tell you—I don't remember.

Q. 346. Your memory does not serve you in con-
1196 nection with the Lennox installation?

A. 346. You ask me offhand, and I don't remember all details.

Q. 347. Now, do you want to tell us that at no time during your connection with The Mercoid Corporation since M-H Exhibit 1 came on the market, about May or June of 1937, that you did not explain to any furnace company or prospective customer the manner and method of installation of M-H Exhibit 1 corresponding to M-H Exhibit 2, that is Illustration No. 7?

A. 347. (Witness pauses.) I don't remember occasions; you see, I don't sell, I mostly spend my time at the factory, and the occasions I am out, I don't remember discussing diagrams in that manner in which you are suggesting, it would not come up; we have a line of instruments, and we talk about selling controls.

Q. 348. Have you ever had occasion to talk to any customer or prospective customer about Mercoid M-80 Controls?

A. 348. Well, at shows I have discussed the instrument with them, and shown them the operation of it.

Q. 349. And when you have shown such customers the operation of it, have you explained that when the limit switch moves to open circuit position, the fan can still continue to operate, provided the fan switch is in closed circuit position?

1197 A. 349. All I have told them, as far as I can remember, is that the M-80 is a combination of M-51 and M-53, and they take the two separate instruments plus two diagrams. I haven't discussed diagrams in that manner. We have sold the instrument for many years, in separate units, as the M-51 and M-53, and prior to that the Figure 50, and have followed that with the same practices with each of those groups; Figure 50 was designed for a certain job, and then we replaced it with the M-51 and M-53, and the M-80 to consolidate the M-51 and the M-53.

Q. 350. And do you want to tell us here that at no time have you explained to customers, or prospective customers, that with your M-80 you can get fan operation even though the limit switch has moved to open circuit position?

A. 350. Well, I might have, because I have told them the others would do that; in fact, we have shown that in our own records.

Q. 351. When did your Company make the change in electrical hook-up from that shewn in M-H Exhibit 5 to the type shown in M-H Exhibit 4?

A. 351. I would have to consult the records, I couldn't tell you; that is a matter of records that can be obtained out of corporation records.

Q. 352. Will you look it up and make that information available to us so that the Reporter may insert your 1198 answer at this point?

A. 352. Yes.

1199 By Mr. Freeman:

Q. 353. Do you, Mr. McCabe, check the circuit drawings that are used by The Mercoid Corporation?

A. 353. Well, I may check some, and my own men check others; I don't do all of the checking.

Q. 354. Do you know whether or not the original drawings corresponding to M-H Exhibits 2, 3 and 4 were made under your direction or supervision?

A. 354. They might have been made by one of my men, and as I told you, they might have been made down in the Advertising Department, or by one of our sales engineers; we can find out, but I can't tell you offhand.

Q. 355. Do you recall when you first saw those drawings—again referring to M-H Exhibits 2, 3 and 4?

A. 355. No, I would have to inquire; I couldn't give you dates.

Q. 356. Have you had occasion to visit some of the schools of instruction carried on by The Mercoid Corporation?

A. 356. You mean, for outsiders?

Q. 357. Yes, that is where you endeavor to educate a group of dealers and their salesmen and representatives in the manner and method of installation, as well as the operation of Mercoid controls?

A. 357. I have never done any school work; that is usually carried on by the sales engineers.

1200 Q. 358. Have you ever sat in at any time, merely as an observer?

A. 358. Well, quite a few years ago, Oil-O-Matic used to run a bunch of schools.

Q. 359. Have you ever had occasion to sit in when Mercoid representatives were explaining the operation of the M-80?

A. 359. I don't remember any.

Q. 360. Have you had occasion at any of those schools to plan the material which your sales engineers or people might show and use at the school?

A. 360. Well, I designed the instruments; you might say that was planning material.

Q. 361. Now, do you want the record to stand that your made up Type M-80 instrument, M-H Exhibit 1, and turned it over to The Mercoid Corporation for sale by The Mercoid Corporation with the suggested diagrams Illustrations 7 and 8, without ever actually having seen or tried one of the instruments yourself or under your supervision in connection with a warm air furnace?

A. 361. I told you we took the—in building that instrument it was built in the laboratory; and for instance, this stem is part of the instrument (indicating), the same as the M-51; and we have an electric oven in the place, with electric heaters in, and these were set up in there and
cheked for differential and operation and compared
1201 with the M-51 and the M-53, as to performance.

Q. 362. And I take it, then, that your Company puts out instruments like the Type M-80 without any field experience?

A. 362. Oh, we have had our field experience; I have just told you, we have been making M-51 and M-53 since 1929, and we made Figure 50's since probably around 1923 or 1924, and we know the requirements of the instrument, and in testing that instrument I can tell what differential it will have, in an electric oven just as well as when it is in a warm air furnace, without having to go around a big furnace and have all that heat; and in our laboratory I have got a small furnace unit, if it is important for you to know whether we found what differentials it will operate at, I can say that we compared it in the oven with the furnace, and it will do everything it does with a warm air furnace; we can pull the M-51 out and put it right in the same location, and we have two thermometers in there, and find out where it turns on, and turns off; and so far as testing, the test will test just as much as any test in the field, because the instruments we have in M-51 and M-53 have now some eleven years of field experience.

Q. 363. But the Type M-80 came on the market without any field experience?

1202 A. 363. I wouldn't say that; I would say our field knowledge—

Q. 364. I am talking about a specific instrument which came on the market without any field experience.

A. 364. I wouldn't agree with you as to that, because our field knowledge was already embodied in the other instrument which is the same; that is no different than an M-51, if you take off one side; if you take off the other side it is an M-53, and it is not changed a bit; and when we set up a differential here and we test it in there it will operate just the same as the other one, because this part of it that goes in the furnace duct hasn't changed a bit, and if this will operate at the same differential it will be the same in the field as the M-51 or the M-53; the calibration has to be done in ovens where we can do it accurately, and not in

a warm-air furnace—we wouldn't use a warm air furnace to do the calibrating.

Q. 365. You tell me when you first saw an M-51 and an M-53 connected up in accordance with M-H Exhibit 4, that is where the limit switch, when it moved to open circuit position, would still permit the fan to run, provided the fan switch was in closed circuit position.

A. 365. Well, that would not be—the M-51 and the M-53 were put out, I believe in 1929; I mind they had—I had a furnace when we were at 564 West Adams street, we
1203 had a warm air furnace there, and the development work on the M-51 and the M-53 was going on in 1928, and tooling I think went on in 1929—I couldn't give you the exact date; but those instruments were made to replace the Figure 50, so I never seen one prior to, say, 1929 in the Fall, because none was put out.

Q. 366. What I am asking you is when you first saw a complete installation of the two separate instruments where when the limit switch moved to open circuit position the fan could still operate, provided the fan switch was in closed circuit position.

A. 366. You mean, an M-51 and an M-53?

Q. 367. The two instruments that you refer to as giving you the necessary field test so that you could make M-80 without any further field test.

A. 367. I just told you, M-51 and M-53 were developed and put on the market in 1929. But as to the date, I could not tell you; but they were used from the time they went out, and immediately replaced the other model.

Q. 368. I asked you when they were so used, as the limit switch, when it moved to open circuit position would permit the fan to continue to run.

A. 368. I said, the M-51 and M-53 were used in—were put out in 1929 so as to—when they were—it would not be prior to that time, but I could not just say when I saw
1204 them; we will have our records searched, and endeavor to give you that information.

Q. 369. As a matter of fact, isn't it true that when you first came on the market with the M-51 and the M-53, you connected them up in accordance with the wiring circuit or diagram of M-H Exhibit 5?

A. 369. No. 5? Wait a minute. Let's see. Now let me see which one that is: (Witness examines documents) Yes. This is M-H 5?

Q. 370. Yes.

A. 370. No, I would not say that.

Q. 371. Then will you produce any and all drawings which you have showing the use of the M-51 and M-53 where when the limit switch moved to open circuit position the fan would continue to run; and I am asking you for drawings earlier than the filing date of a Freeman Patent.

A. 371. I might—

(Here ensued a discussion off the record, not reported as directed.)

By Mr. Freeman: May we agree with you, Mr. Moore, that when and if those drawings are produced, Mr. McCabe will make himself available for examination as to those drawings?

By Mr. Moore: Certainly.

By Mr. Freeman: And we will keep this witness' 1205 deposition open until he has an opportunity to check his records?

By Mr. Moore: Certainly, because that may take some time.

By Mr. Freeman:

Q. 372. You incidentally are the Ira McCabe who received a patent medal recently for your work in connection with controls?

A. 372. You mean, that award?

Q. 373. Yes.

A. 373. Yes.

By Mr. Freeman: That is all for the present.

By Mr. Moore: Before we start on the cross examination, I would like to state that Mr. McCabe has been asked to produce certain wiring diagrams. Mr. McCabe has testified that the sales engineers have made wiring diagrams and submitted them to him, but he did not state whether or not all of those wiring diagrams were submitted to him before they were sent out, and it means that Mercoid will have to go through all of his correspondence and of his sales engineers to produce the information requested. Mercoid is perfectly willing to do this, but it may take a considerable time; but as soon as this information has been discovered, Mr. McCabe will present it, for further 1206 continuance of these depositions.

Is that agreeable to you?

By Mr. Freeman: Yes.

(After a short recess, the following:—)

By Mr. Moore: Inasmuch as the defendant has asked that certain information and diagrams be produced, which

may or may not affect the testimony given by this witness. I wish to suspend my cross examination until those records are produced.

1207 By Mr. Freeman:

Q. 375. Now Mr. McCabe, you were asked to look up your records with regard to the circuit arrangement used in connection with test installations; have you looked up your records with regard to any test installations?

A. 375. (Witness further examines said transcript.) I do not find anything on these pages where you asked me with regards to this—to the circuits used in tests.

Q. 376. I am referring—

A. 376. (Interpolating) I thought you—may I read the—? Apparently you are going off—a mile off the record here.

Q. 377. Will you read Question No. 124, and your answer, and then tell us whether you did look up your records in order to complete the answer to Question 124?

A. 377. (Witness examines sundry pages of said transcript.) I haven't that particular information; as I understood, Mr. Moore wrote me a letter as to the things I was asked, and I didn't have any—find in his letter any-

1208 thing in regard to circuits and tests on furnaces; however, I could state as regards the testing in the laboratory, that was done on a little—a little oven.

Q. 378. Well, give us the circuit arrangement of the tests that you make, of devices like M-H Exhibit 1.

A. 378. Well, there was an oven about a foot square, and there is a heating element within this oven, and the instrument is mounted with the stem in there, and thermometers are arranged within that oven so that we can find the points at which the instrument makes or breaks the circuit, and the control is usually hooked up with either the heating element, or it may be hooked up through a relay with the heating element; that is, if we want to get the operation point of that thermostat, if you are operating with the heating element you can cut off the heating element with the control itself; and if we were testing on the fan control side, of course you would make it—arrange it with a relay that was normally—Let's see, if you are testing the fan side; the fan circuit would be normally open so that you would have a relay that was normally closed, and when the relay was energized that would open that particular circuit; by that method you can get the operation, if the man is there and checks the thermometer at that time;

and we do such testing by comparison as to the standards; for instance, when we would compare it, we would
1209 take an M-51 or an M-53 and test it, and then we would take an M-80 and put it in the same location, and test it, and compare the two results.

Q. 379. What is the sequence of operation of the M-80 when you made tests of the kind that you have just referred to, that is, the relationship of the limit switch with respect to the relationship of the fan switch?

A. 379. Well, it wouldn't make any—there wouldn't be any difference, probably only one side would be hooked up at a time for that testing; if you are trying to test one side, you operate one unit; if you are trying to test the other side, you operate the other, and connect up accordingly.

Q. 380. Have you ever made any tests, either yourself, or under your supervision, wherein the M-80 was used in connection with a warm air furnace, in what we might call a practical installation under normal operating conditions?

A. 380. Well, no; as I told you, the tests that were made, were in the laboratory; we make instruments, we don't make warm air furnaces.

Q. 81. Have you ever personally, or under your supervision made a test of an M-80, in a warm air furnace?

A. 381. I know I haven't made any under—in a warm air furnace; and what some of my men might have done at any time, I could not tell you.

1210 Q. 382. Have you ever had occasion to observe the operation of an M-80 in a warm air furnace?

A. 382. (After a pause) I might have seen them at a convention or something, but I haven't any recollection.

Q. 383. Then, as the designer and engineer of the M-80, you want to testify that you never saw the M-80 under practical working or operating conditions in a warm air furnace?

A. 383. (Witness pauses) I have told you that our tests were made in the laboratory.

Q. 384. Will you answer my preceding question?

A. 384. Yes, I have; I can't remember of having seen them; as I say, there were some, I remember, at a convention in New York, I saw them on a furnace, but I don't even remember whether the furnace was in operation; as I told you, we test in the laboratory for comparative operation, and the M-80 was a modification—the stem and bimetallic portion of the instrument is similar to the M-51

and the M-53, and the operation of those has been satisfactory over a period of, well, since about 1928 or 1929, and when we made the M-80 the comparisons could be obtained right in the laboratory.

Q. 385. And you want the record to show that you personally never made any test of the M-80 in connection with a furnace?

1211 A. 385. No. It wasn't necessary.

Q. 386. And you were the designer of the M-80, correct?

A. 386. Well, I contributed to its design, yes; I have a group of men with me.

Q. 387. And up to the present time you have never seen an M-80 in a practical installation?

A. 387. I don't have recollection—as I told you, I have seen them in shows on furnaces, but as to their operation, I haven't a recollection; I have no occasion to know—I don't go in the field.

Q. 388. And I take it, then, you have never observed the actual operation of the M-80, as to when the limit switch opened, and its relationship with respect to the fan switch.

A. 388. I have no occasion to do that.

Q. 389. And I also take it that so far as the sequence of operation of the M-80 in connection with a furnace, you never observed the operation of the M-80?

A. 389. I am aware of how it can be adjusted, however, whether I have seen it or not; I don't know just what you are driving at, but I can tell you that it is adjustable to very many sequences—more than one sequence, anyway.

Q. 390. And I take it that you have never observed the operation of the M-80 when set in accordance with the setting as recommended by Mercoid in its Bulletins?

A. 390. I personally probably have not; I am aware of how it would operate, however.

1212 Q. 391. Although you have never seen such operation?

A. 391. (No response.)

By Mr. Freeman: Did he answer that?

By the Reporter: No answer.

By Mr. Freeman: Read the question.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 391. I might have, and I might not have; I am not able to state.

By Mr. Freeman:

Q. 392. Just what is the sequence of operation of the M-80 combination fan and limit control as advertised by Mercoid Corporation, with which sequence you are familiar, or aware of?

A. 392. That is available in the Bulletins; if you will get me a Bulletin, I will read it to you.

Q. 393. (Handing document to witness) And I hand you M-H Exhibit 1-A, installation instructions for the Type M-80 (handing another document to the witness).

A. 393. Under "ADJUSTMENT" it states (reading) "The fan control is usually set about 120 degrees low to 150 degrees high. On the majority of warm air installations, using forced circulation, the limit switch is usually set to cut out at temperatures between 200 and 250 degrees. The cut-in point is usually set at approximately 50 degrees below the cut-out point. There are, however, many installations in which this particular adjustment might be insufficient or excessive, therefore a careful study of each case must be made."

Q. 394. Now, will you give me the sequence of operation when the adjustments are made strictly in accordance with the settings which you have read from the Installation Bulletin L-4, M-H Exhibit 1-A, and when hooked up as shown in connection with said Exhibit M-H Exhibit 1-A?

A. 394. I believe that was discussed, and in your earlier exhibits there are a number of diagrams in which all those were given.

Q. 395. Well, you know, do you not, Mr. McCabe, the sequence of operation; why not just tell us briefly the sequence of operation, that is, the relation of the limit control with respect to the fan switch?

A. 395. Well, the limit control does not interfere with the fan switch at all; the fan switch is one switch, and the limit switch is another switch, and each operate according to the response of—or the changes of temperature and the adjustments which are made for them.

Q. 396. And when the M-80, corresponding to M-H Exhibit 1, is set in accordance with the Exhibit M-H Exhibit 1-A, the limit control can move to open circuit position, and the fan can continue to run?

1214 A. 396. Oh, yes; that is the same as they have always—we have always had them running—since 1926 limit controls have been used to control the burner, and fan controls have been used to control the fan; and in this case

it is exactly the same, only that they are built in one instrument instead of two.

Q. 397. And a single bimetallic helix controls both switches?

A. 397. That is right.

Q. 398. Now, will you give me any of the drawings that you have that show the particular sequence that you just described or explained in your preceding answer?

A. 398. Any of them? You mean, that I have located? Is that what you are referring to?

Q. 399. No, I want what drawings you have in connection with what you testified to a minute or two ago, as having been done by you in 1926 or 1927.

A. 399. I did not bring the drawings of individual units as I just described, except this drawing No. 962 (indicating); I have also correspondence with our trade at various times, which indicates the method of operation which I have just described to you, and also refers to drawings, but the letter does not carry with it the drawings, which were probably made in pencil and sent with installation; however, the descriptions are so clear that they answer the statements which I have just made as to the individual controls operating independently and operating in accordance with what you requested.

1215

Q. 400. That is, where the limit switch, when it moved to open circuit position, would still permit the fan to continue to run?

A. 400. Yes. I might refer to a letter of September 10, 1928, and our answer on September 14, 1928; the letter is from The XXth Century Heating & Ventilating Co., of Topeka, Kansas, and they made requests as follows—Do you want to read the letter, or do you want me to read the letter to you?

Q. 401. You answer it any way you want to; but before you do that, did you look for drawings that show the sequence of operation, where the limit switch when it moved to open circuit position would permit the fan to continue to run?

A. 401. I did look for drawings, and I found these following things referring to these drawings.

Q. 402. But you found no drawings?

A. 402. No, but I found descriptions which in themselves are clear enough to describe the exact operation, and our recommendations for such operations.

1216

Q. 403. But you found no drawings?

A. 403. Other than the drawing here (indicating); I did find—

Q. 404. (Interpolating) And the drawing here that you are referring to—

A. 404. (Interpolating) that is a later drawing in which a low voltage circuit is used.

Q. 405. When is it dated?

A. 405. In 1934.

Q. 406. August 24, 1934?

A. 406. Yes.

Q. 407. And that, I take it, was the first drawing that you were able to find?

A. 407. I located, as I said, these letters and—

Q. 408. (Interpolating) You will be given an opportunity to talk about those letters; I am now trying to find out from you what you found in your records.

A. 408. Yes.

Q. 409. By way of drawings.

A. 409. Yes.

Q. 410. And I take it that the first drawing that you found is the one that you have here produced, dated August 24, 1934.

A. 410. Other than those which were separate, that is, in which we showed drawings of the fan control, and also drawings of the burner, and those led, of course, to our going to the sources of the others, and that has already been made a part, in the case, in depositions taken at Bloomington.

1217

Q. 411. Have you read the depositions taken in Bloomington?

A. 411. No.

Q. 412. You saw the installations at Bloomington?

A. 412. I have seen the installation at Bloomington.

Q. 413. Now may I have the letters that you have just referred to?

By Mr. Moore: Which ones have you referred to?

By the Witness:

A. 413. I referred to The XXth Century Heating and Ventilating Company, and I also—I was interrupted, I also have one from the Holland Furnace Company.

By Mr. Moore: Holland Furnace Company.

By the Witness:

A. 413. (Continuing) And one from the—and one with our answer, you see, there are two letters—three sets of letters, one from The XXth Century Heating and Ventil-

ating Company, and our answer; one from the Holland Furnace Company, of Beloit, Wisconsin, and our answer; and a letter—a copy of our letter to Hardinge Bros. Inc., of Chicago; these are merely descriptive of a large number of such letters, referring to the furnace and fan controls, which are in our files—our early files.

1218 By Mr. Moore: Here is an extra set of those (handing documents to Mr. Freeman).

(A recess was here taken, during which counsel for defendant retired from the room; after which the following:—)

By Mr. Freeman:

Q. 414. In connection with the Mercoid letter to The XXth Century Heating & Ventilating Company, a catalog, page 33, is referred to; do you by any chance have that catalog page, or did you in your investigations, dig up the particular catalog page there referred to?

A. 414. I did not refer to it; however, I think that would probably be the 1928 catalog.

Q. 415. And do you have the 1928 catalog, and will you refer to page 33 thereof?

By the Witness: Have we got a 1928 catalog?

By Mr. Moore: I do not think we have got it with us.

By the Witness: I don't know whether we have one here or not.

(After a discussion off the record, not reported as directed, the following:—)

By Mr. Moore: What is the question?

(The pending question as above recorded was read
1219 by the Reporter.)

By Mr. Moore: Now, what is your answer?

By the Witness:

A. 415. No, I did not refer to that catalog or page.

By Mr. Moore: What was the question about, have you the catalog?

(The record as above recorded was further read by the Reporter.)

By Mr. Moore: The 1928 catalog, No. H-3, 1928, was attached to Mercoid's answer to the M-H interrogatories filed September 3, 1940, in this case.

(After further discussion off the record, not reported as directed, the following:—)

By Mr. Freeman:

Q. 416. The 1928 catalog that we have, ends with page 28; might the page referred to in The XXth Century letter

as "33", actually be a typographical error, and refer to page 23 of your catalog?

A. 416. It probably is, because the letter of January 15, 1929, to Holland Furnace Company, refers to page 23. The man who wrote this letter is deceased.

Q. 417. Now, in the 1928 catalog, do you find therein any circuits therein where, when the limit switch moves to open circuit position, the fan is still permitted to run; and if so, will you point out such circuit?

1220 A. 417. (Witness examines document) Inasmuch as the catalog page refers to instruments, the statement regarding the limit control states (reading)

"When so installed this control operates as a positive safety device to prevent over-heating Standard range 250° F. to 300° F., opening the electric circuit at the high point and restoring it on a 50° drop in the temperature in the furnace dome." On furnace fan control, it states: (reading)

"Furnace Fan Control for automatic control of booster fans on warm air furnaces."

And states:

"Standard range is 190° F. to 140° F., cutting in at high point to start the fan motor and cutting out when the dome temperature drops down to the low point."

In the letter to The XXth Century Heating & Ventilating Company, we state that we can,

"furnish our Fig. 50 Control, with standard range 250 to 300° F., mounted in the drum of the furnace and connected in the line ahead of all other controls. Please note our catalog. Regarding the furnace fan, the same type of control is used, but with a range 190 to 140°, to cut in at high and off at low. The fan will not start until the dome reaches a temperature of 190° and will continue to run after
1221 the burner is off until the temperature in the dome drops to 140°, thus using the latent heat of the furnace. This latter control would be connected in series with the line and fan motors."

Since it would only be connected in series with the line and fan motors, and since it states that the fan "will continue to run after the burner is off until the temperature in the dome drops to 140°, thus using the latent heat of the furnace", and since it states that this control "would be connected in series with the line and fan motors", this would allow the fan to run after the furnace was shut down.

Q. 418. And in that respect the letter corresponds to page 23 of the your 1928 catalog?

A. 418. That is what the heat control is specified to do, and that is what the letter says it will do.

Q. 419. And the letter, I believe, that you referred to, The XXth Century letter referred to the limit control being installed ahead of other controls; is that correct?

A. 419. That refers, of course, to the—

Q. 420. Limit control?

A. 420. (Continuing)—limit control.

Q. 421. And the letter that you have referred to, of course, was not written by yourself, and your explanation is your present interpretation of what the letter purports to state?

1222 A. 421. The letter purports to state that, but the customer requested, in his staatement, as follows: (reading)

"I have the old style Burner installed which uses Minneapolis 15V Thermostat. I am using Honeywell Mercury 15V Stack switch for safety."

Q. 422. And the customer wanted a safety switch?

A. 422. Wait, I am not through. Incidentally, in the previous paragraph, he mentions it is "an OIL-O-MATIC Burner". (Reading)

"I have often had the experience with an old thermostat of the points sticking and failing to cut off the burner, however, I now have installed a new 15V. Thermostat and this may happen again. I want to eliminate extra high temperature inside the Casing in that event, and need an extra control for this purpose, and wondered if you have this #50 for this purpose to be hooked in series with the motor of the burner or in one side of the line, along with a Mercoid control which will give me control on a Miles Automatic Furnace Fan which I have installed on this job. I do not want the fan to come on as soon as the burner on account of the air feeling cold. I want the Fan to come on when the proper Temp is reached inside the casing and continue to operate until Furnace has cooled down to

1223 a certain point. Do you have any dual controls for this purpose of the type specified for Warm Air Furnace installations? If so, what is the number of the control and the net price or list with present discount. Please send descriptive literature covering requirement and also advise if it is necessary to use two of these controls to accomplish desired results."

Then there is a postscript, which says: (reading)

"My fan is now hooked on separate circuit from oil burner and would as soon operate it separately from burner circuit."

In other words, he says it is on a separate circuit from the oil burner. And our letter advises him that this latter control, which was referring to the fan control, would be connected in series with the line and fan motors; however, has already stated that it was now hooked on a separate circuit from the oil burner, and if that is so it would operate separately from the burner, or from the limit control of the burner.

Q. 423. However, when you answered the letter, that is, the Mercoid Corporation, it specified that the limit control should be placed ahead of all other controls; correct?

A. 423. That, however, does not state that it should be hooked ahead of the fan control.

1224 Q. 424. It does state, does it not, that it should be connected ahead of all other controls; will you answer my question, "Yes" or, "No"?

A. 424. That is what the letter says; however, I would not state—agree that that was intended to, since the man is—who wrote the letter, is no longer with us but is deceased, I cannot speak for what he intended: I can only interpret.

Q. 425. And your interpretation, then, of the letter, where the writer said "ahead of all other controls" is that it might not be mounted "ahead of all other controls"?

A. 425. No, at that time it was our practice—we built what was known as line voltage controls, and as referred to in this letter he had difficulty at times with a thermostat sticking; as this man had stated, it failed to cut off the burner, as I will read you (reading):

"I have often had the experience with an old thermostat of the points sticking and failing to cut off the burner."

So we used to, as a matter of policy, advise our customers to put the limit control ahead of other controls on the burner, whereby it would stop the burner when it shut off, and it would not depend on some other mechanism; and by using a high voltage job the burner could not operate when it tripped. In the controls as described here, in low

1225 voltage operation a relay might not operate, due to sticking of contacts in that particular system that the man has discussed here, and in that event you had a hazardous condition; therefore we suggested putting this con-

trol ahead of his Honeywell—ahead of his Minneapolis-Honeywell equipment.

Q. 426. Well, you actually recommended in accordance with your standard custom back in 1928, that the limit control be mounted ahead of all other controls; that was your standard custom at that time?

A. 426. That is right, but it had no bearing on the fan control, because often, why people mounted these on separate circuits, or at the time of wiring the fan controls many of them were installed where there were no limit devices of any kind.

Q. 427. But you have no drawings, circuit drawings wherein the limit control was so mounted that the fan control, and the fan controlled by the control would operate when the limit switch was moved to open circuit position; I am talking about drawings prior to—

A. 427. (Interpolating) As I tell you, we did not engage in the business of making drawings, we sold controls, which are switches, and until we came out with low voltage it wasn't necessary to supply our trade with a lot of complicated diagrams, where the control was two wires.

1226 Q. 428. You did, however, in connection with the M-50, Figure 50, put out wiring diagrams for recommended installations, did you not?

A. 428. We said they were typical wiring diagrams, but we did not put out all the diagrams that we were using at the time.

Q. 429. Did you put out any typical wiring diagrams wherein the limit switch when in open circuit position would permit the fan to continue to operate; and if so, will you produce any of your early typical drawings?

A. 429. We have not offered any, and I don't know of them, where they are, because—.

Q. 430. Are you through?

A. 430. The letter of August 4 to Hardinge Bros. refers to a drawing, and that drawing is not available; however, it states that—I will read the letter (reading):

"Confirming our conversation of Wednesday we are inclosing drawing of the circuit for the installation that we were discussing. There is one change in this circuit which we believe should be called to the attention of the architect. This has to do with extra Fig. 50 control which is indicate on the drawing by a red arrow. This control causes a delay action of the fan motor, preventing the blow-

ing of cold air into the building on the start of the
1227 burners. It also has the delay on the cut off and
uses the latent heat of the furnace after the burners are off."

Now, if it "uses the latent heat of the furnace after the burners are off"—and that is what the paragraph calls for—if the limit control cut off and there is latent heat in the furnace, it would not use that latent heat unless the fan run, according to this statement.

Q. 431. Yes, but according to this statement, if the limit control were placed in accordance with each and every one of your typical drawings of your 1928 Bulletin or Catalog, the fan would then stop running; correct?

A. 431. If a furnace fan was put on a burner, on a job in which a burner was installed, and it was wired independent of the burner, it would continue to run after the burner cut off, whether it cut off from the limit control or from the thermostat or from the safety control.

Q. 432. I understood you to use the word "if" in your preceding answer; correct?

A. 432. That is right. And we sold fan controls so arranged to be wired.

Q. 433. But you never presented or gave any wiring diagrams to purchasers wherein the limit control was independent of the fan control?

A. 433. No, it wasn't necessary to provide them a
1228 wiring diagram then; the wiring diagram which you
are referring to, in which the limit control cut off the fan, was one arranged specially to permit a delayed operation of the burner when the limit control shut off, because when the fan was allowed to remain on, in many installations the period of operation was too short and the burner started up immediately again, and that was one reason there was a specific diagram to meet a condition, otherwise they wired them as they pleased, that is in the opposite manner.

Q. 434. Now, as a matter of fact, taking your 1928 catalog, and the setting of the controls in accordance with that 1928 catalog and the drawings of the 1928 catalog, so long as the limit switch was in closed circuit position, then the fan would run if the temperautre in the bonnet was high enough?

A. 434. That is right.

Q. 435. And that was in your 1928 installation?

A. 435. That is a specific diagram; however, I main-

tain, and we have shown you in the field the other type of installation was made.

Q. 436. Wherein have you shown us?

A. 436. They were shown in Bloomington, if you will remember.

Q. 437. Did you read that testimony?

A. 437. I was on the installation myself, and saw
1229 the installation; and that installation is so arranged that the fan continues to run after the limit control cuts off.

Q. 438. And when did you first see that installation in Bloomington?

A. 438. Since we last took testimony.

Q. 439. About a month ago?

A. 439. Yes.

Q. 440. And I take it, you have seen other installations since then, have you not, wherein the limit switch when moved to open circuit position would permit the fan to run?

A. 440. Not since then.

Q. 441. Well, whatever information you have had with regard to the so-called Bloomington installation was information that came to you in the year 1940?

A. 441. Not as information; you are asking me when I had information: We have additional letters in our files similar to these, in which we mention these booster fan controls and limit controls.

Q. 442. I am talking about the installation that you say you saw in Bloomington, and I am now asking you when you first saw that installation?

A. 442. Since we took testimony last time.

Q. 443. And that was in the year 1940?

A. 443. Oh, yes.

1230 Q. 444. So, prior to that time you knew nothing about the Bloomington installation?

A. 444. Not that particular installation.

Q. 445. Now, do I understand that the drawings that were attached to your 1928 catalog, were special drawings?

A. 445. They were typical drawings—if you look at the heading at the top of the page.

Q. 446. And in each of these typical drawings, the limit switch is ahead of the other controls; I am limiting my question to where a fan control is used in connection with the circuit drawings.

A. 446. (Witness examines said document.)

By the Witness: What was the question?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 446. There is no fan control shown on this page 28 of the 1928 catalog; we are referring to this page 28, as I understand.

By Mr. Freeman:

Q. 447. Yes.

A. 447. Yes.

Q. 448. Now, do you have any catalogs which have here been introduced wherein the limit switch is shown capable of moving to open circuit position, and where the 1231 fan will continue to run—earlier than 1931?

A. 448. (Witness examines documents at considerable length.)

By the Witness: Now let us have that question.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 448. There are no diagrams in those catalogs showing that (indicating documents).

By Mr. Freeman:

Q. 449. And you were requested to check the records of the Mercoid Corporation as to test drawings, to determine whether or not there were any drawings available in the Mercoid files showing an installation, or showing a circuit wherein the limit switch did not affect the operation of the fan; and I understand that you have found no such drawings dated earlier than January, 1931?

By Mr. Moore: Now, read the question.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 449. We have not found such drawings.

By Mr. Freeman:

Q. 450. And I take it, also, that you found no drawings earlier than December 31, 1931—and I use that date 1232 because you happen to have a 1931 catalog here—and you found no drawings?

A. 450. You mean, that were put out by Mercoid; is that correct?

A. 451. Earlier than December 31, 1931.

A. 451. You limited that to those put out by Mercoid?

Q. 452. That is right.

A. 452. That is right.

Q. 453. That is, the answer is, "I found no drawings"?

A. 453. I found no drawings that were put out by Mercoid.

Q. 454. Did you have any drawings then?

A. 454. We found some drawings.

Q. 455. Earlier than December 31, 1931?

A. 455. Yes.

Q. 456. Will you produce such drawings?

A. 456. They were the drawings which were introduced in the Bloomington testimony, that is we had—I had an Oil-O-Matic Manual, and similar drawings were introduced at Bloomington.

Q. 457. Did you check those drawings that were introduced at Bloomington?

A. 457. I haven't seen that testimony, but I understood they were to be introduced.

Q. 458. I take it, you checked the manual?

A. 458. I checked the manual we had.

1233 Q. 459. That is, the Mercoid Manual that you had?

A. 459. No, the Oil-O-Matic Manual.

Q. 460. And did you find such drawings in that manual?

A. 460. We found drawings which were later introduced at—as I understand, they introduced those at the Oil-O-Matic testimony at Bloomington; I haven't seen that testimony so I don't know.

Q. 461. And your haven't seen the exhibit drawings either?

A. 461. No.

Q. 462. So what you are testifying to with regard to what Williams Oil-O-Matic did, that is really hearsay information that you obtained from others?

A. 462. Yes, sir.

Q. 463. Now, I asked you for the first drawings put out by The Mercoid Corporation as wiring diagrams for M-H Exhibit 1; can you now tell us when wiring diagrams were first put out by Mercoid for use in connection with the Mercoid Type M-80 control, M-H Exhibit 1?

By Mr. Moore: Page 82 in the record.

(Here ensued a discussion off the record, not reported as directed; after which the following:)

By the Witness:

A. 463. Unfortunately, I have overlooked this particular item, and I don't know.

1234 By Mr. Freeman:

Q. 464. They didn't put out any circuit drawings prior to the time that they put out the device M-80, M-H Exhibit 1?

A. 464. They didn't put out any circuit drawings showing the M-80 use, if you want to qualify it that way.

Q. 465. What earliest drawing then have you, as the result of the inquiry that we made on September 20th, that you have here now, wherein the limit control does not affect the operation of the fan control; I want your earliest drawing.

A. 465. That I have here?

Q. 466. I want the earliest drawing that you were requested to produce, after having about a month to check your records.

A. 466. This (indicating) is the earliest drawing put out by the Mercoid—drawing No. 962.

Q. 467. And the date of that drawing?

A. 467. That is August, 1934.

Q. 468. And that drawing dated August 24, 1934, was discovered as a result of the search and investigation that you told us you were going to make on September 20th when you were last testifying?

A. 468. Yes, sir.

Q. 469. And on page 95 of our record, Question 371, you were asked to produce all drawings showing the use 1235 of the M-51 and M-53 where, when the limit switch moved to open circuit position the fan would continue to run; and the question was further limited to drawings earlier than the filing date of the Freeman Patent; and I take it, now, that the drawing you have here produced, your Drawing No. 962, dated August 24, 1934, is the earliest drawing that you have showing the M-51 and the M-53 operating as specified in Question 371?

By Mr. Moore: Read the question.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 469. That was limited again to the M-51 and -53, I believe; if so, that is the earliest drawing.

By Mr. Freeman:

Q. 470. That is what the question was.

A. 470. Yes. I wanted to be sure that that is what the question was.

1236 By Mr. Bair:

Q. 1. Your name is Hugh Courteol?

A. 1. Hugh Courteol.

Q. 2. And you are President of The Mercoid Corporation?

A. 2. That is right.

Q. 3. How long have you been President?

A. 3. Since February 15, 1938.

Q. 4. Were you associated with The Mercoid Corporation before you became President?

A. 4. No, sir.

Q. 5. Before you made your connection with Mercoid, were you engaged in any business having to do with the sale or manufacture of furnace controls?

A. 5. No, sir.

1237 Q. 6. What, in general, are your duties as President of Mercoid?

A. 6. Well, I should say that I am principally on the financial and merchandising end of the business.

Q. 7. Does anyone act as General Manager of the Company?

A. 7. No, sir, we have no specific title of that sort in our Corporation.

Q. 8. Are sales under your general supervision?

A. 8. Sales are under the general supervision of Mr. J. W. Owens.

Q. 9. And you are his superior?

A. 9. That is right.

Q. 10. Now tell us just briefly for the record, what is the business of The Mercoid Corporation.

A. 10. The manufacture and sale of automatic controls.

Q. 11. And that has been its business since your connection with it?

A. 11. That is correct.

Q. 12. As President of the Corporation, you signed the Complaint in No. 1839, that is, The Mercoid Corporation against Minneapolis-Honeywell Regulator Company?

A. 12. Yes, sir.

Q. 13. And you signed the Plaintiff's Answers to the Defendant's Interrogatories in that case?

A. 13. Yes.

1238 Q. 14. Will you tell us generally what method is used by Mercoid in selling its products; what I mean is, does it sell by salesmen, or by mail, and so on?

A. 14. Well, we use, I should say, most of the conventional methods of selling; we have representatives who travel; we do some advertising; we do some sales by correspondence; we put out a catalog—some twenty-five thousand or forty-five thousand—I imagine, thirty-five thousand are on our mailing list for catalogs, to a very miscellaneous kind of trade engaged in practically all forms of domestic and industrial engineering.

Q. 15. Do you sell to manufacturers of furnaces?

A. 15. Yes.

Q. 16. And to manufacturers of oil burners?

A. 16. Yes, sir.

Q. 17. Something has been said here of the Engineering Department of The Mercoid Corporation, not referring to the engineering work done by Mr. McCabe's own organization; am I correct in the assumption that Mercoid has an independent Engineering Department of its own?

A. 17. You are not correct.

Q. 18. Something was said of sales engineers; does Mercoid have sales engineers?

A. 18. Yes, Mercoid does have some sales engineers.

Q. 19. Now, what kind of engineering duties do 1239 these sales engineers perform?

A. 19. Well, the sales engineers' duties in general are the promotion of the sale of Mercoid controls plus which—that is, plus the ordinary accepted sense of the term selling; they are graduate engineers, and as such are more able to be of assistance in the field where they might be called upon to explain the nature of the operation of the control, might be able to suggest certain applications, that the typical salesman, not qualified as a graduate engineer, might not be able to do; they are somewhat different in that respect.

Q. 20. I took it from what Mr. McCabe said that you make a good many special installations; isn't it a fact, however, that the bulk of the installations, for instance, with M H Exhibit 1, that is, the Mercoid combination fan and limit control, are more or less standard?

A. 20. I didn't recall that Mr. McCabe testified that our men made installations—special installations.

Q. 21. I wasn't thinking of installations by your men, I mean the installations in which the control is used, aren't they more or less standard?

A. 21. Oh, I see.

Q. 22. More standard than special? ?

A. 22. Yes, except that they lend themselves to a wide variety of applications; I mean, there is nothing
1240 standard about where you will see a Mercoid control go up; some of our domestic engineering controls—I mean, some of our domestic—some of our heating types find their way into industrial applications, a field quite apart from, for instance, the furnace field.

Q. 23. Turning back to your comment a moment ago, it is a fact that your sales engineers help your customers make installations, or demonstrate to them how installations should be made?

A. 23. Well, I think it is quite possible that they would be able to make suggestions, and would; our sales engineers are capable enough that in years past they have themselves made up wiring diagrams, that is, suggested wiring diagrams in the course of their activities with the Company.

Q. 24. Confining ourselves for the moment to the combination fan and limit control, M-H Exhibit 1, is it the practice of Mercoid sales engineers to put up, or supervise demonstration installations for prospective customers?

A. 24. No; that is, to the best of my knowledge they do not.

Q. 25. Do they go out and help customers in any way in making a model or demonstration installation when a new customer takes on the line; particularly I am referring now to M-H Exhibit 1?

A. 25. Well, I think that—of course my knowledge
1241 of the practice is somewhat limited, that is, limited in the sense that my period of service with the Corporation is relatively short—I believe this is true, that there is a great deal of knowledge resident in the heating field as to the hooking up of various types of furnace controls, so that while such a thing might occur, I don't know of instances at all, and in all probability such contacts might come later on in case they had a service problem; in the ordinary case my experience is that there has been enough knowledge in the field, that that is not a part of their routine.

Q. 26. Does Mercoid have service men?

A. 26. No, Mercoid has no service men, so-called; we have men who are capable of finding out what is wrong with a control, if they are called in on a situation in the field.

Q. 27. Well, now, turning to some of those situations where, for instance, a customer has had some trouble with

an installation of the combination fan and limit control, M-H Exhibit 1, do you then send out the sales engineers to help the customer out?

A. 27. Not ordinarily, no; no, what happens there is, in accordance with the terms of our catalog and the agreement that is reflected therein, the customer will take the control off and send it back to us, and we would repair it and send it back to him.

1242 Q. 28. Do you mean that that is your general custom?

A. 28. That is our policy.

Q. 29. And do you mean that you never do send these sales engineers to see these installations on the job?

A. 29. I wouldn't want to make it that broad, no.

Q. 30. Would you say that it is a fact that sometimes the Company does send a sales engineer out to see the actual installation, to determine what the trouble is and try to cure it, or tell the customer how to cure it?

A. 30. Yes.

Q. 31. And has that been the practice since you were President?

A. 31. In the limited sense that I stated, yes.

Q. 32. Well, I mean sometimes?

A. 32. Yes.

Q. 33. These sales engineers do go out into the field where some customer has had trouble with an installation, and look over his installation and try to help him fix it up?

A. 33. That is correct.

Q. 34. I am talking now of installations of the control M-H Exhibit 1.

A. 34. That is correct.

Q. 35. When the sales engineers go out on such particular trouble jobs, do they then make reports to the Home Office?

1243 A. 35. Not necessarily; no, not necessarily; it depends on whether they would regard it as of enough importance to report.

Q. 36. Who checks on them to find out what they have been doing when they have been out on such a trip?

A. 36. On them? On our salesmen?

Q. 37. Yes, when a sales engineer has been out on one of those trips he might help on—you might call it a trouble shooting job, who checks that sales engineer to find out what he has done and whether what he did requires any action by the Company?

A. 37. Well, our salesmen report to the Sales Manager in The Mercoid Corporation, who would have jurisdiction in that regard.

Q. 38. Have you yourself ever gone out with any of those men on one of those trouble shooting expeditions, to see such an installation?

A. 38. No, sir.

Q. 39. You don't see their reports after they come in?

A. 39. Yes, I see some of their reports; I see all of the reports with regard to accounts that we may be working on, in which I am interested in a sales way.

Q. 40. Well, I mean particularly do you see the reports that they make on their solutions of troubles that have occurred in installations?

1244 A. 40. With regard to what control?

Q. 41. Well, I am trying to limit this for the time being to the combination fan and limit control.

A. 41. I recall no report on service troubles with respect to the combination furnace and fan control.

Q. 42. You don't recall any single instance of any customer having reported any trouble with that since you went with the Company in 1938?

A. 42. Well, that is pretty broad, because for quite a long while with The Mercoid Corporation one control looked like another to me; I might be interested in the general aspect of service, for instance, without confining it to any one control; there are a lot of things of which I have not yet gained technically an intimate knowledge of the Corporation.

Q. 43. But so far as your memory serves you now, you don't recall any instance where the Company had any report of any trouble with the control?

A. 43. That is right.

Q. 44. Do you maintain any research and testing department other than the one conducted by Mr. McCabe?

A. 44. We do not.

Q. 45. Before you put out a control to the public, are any field tests made of the control?

A. 45. Not—well, it depends on the control that
1245 you talking about; if you are still confining your questions to the combination fan and limit switch, I would have to say regarding that, that I wasn't with the Company at the time this control was inaugurated.

Q. 46. And then you don't know whether any field tests were made of it?

A. 46. I don't.

Q. 47. Before the Company began to market it?

A. 47. I don't.

Q. 48. Do you know whether field tests are made of any of the controls the Company puts out?

A. 48. Well, it depends what control, sir.

Q. 49. When you start to market a new item.

A. 48. It depends what control; we, of course—as was testified earlier, in reference to some controls, have a great deal of prior knowledge, and know what is going to happen in the field, and those conditions can be duplicated almost one hundred percent, as in Mr. McCabe's department—Mr. McCabe's laboratory. We are putting out a control today, the so-called Mercoid Visaflame Control which due to its novelty, due to its newness as a controlling apparatus is requiring some field testing; and I guess my answer to that is that it depends.

Q. 50. Do you know of any such tests made on warm air furnaces?

1246 A. 50. I know of no tests made by The Mercoid Corporation.

Q. 51. What about tests made by Mr. McCabe's group?

A. 51. I know of no tests made by Mr. McCabe's group; the same policy as regards the setting up would be in force there; the furnace manufacturer's forces would do that themselves.

Q. 52. You are familiar with Mercoid Bulletin L-4 which has been introduced here in evidence as M H Exhibit 1-A, do you happen to know who prepared the wiring diagrams shown in Illustrations 7 and 8 of that Bulletin?

A. 52. No, not in the absence of—no, I don't—that is my answer, I don't know who prepared it.

Q. 53. Going back a moment, might I ask you if you know whether anyone makes field tests of Mercoid controls before they are put on the market?

A. 53. I couldn't answer that.

Q. 54. Who made the tests of the Visaflame that you spoke of?

A. 54. Well, we have had quite a number of burner manufacturers who have taken the Visaflame for experimental testing, and offhand I couldn't give you a list of those; it seems to me there is quite a large number, fifteen or twenty.

Q. 55. Do you happen to know from your knowledge of

the records of the Company whether any of those 1247 companies or any other companies made field tests of M-H Exhibit 1 before that control was put on the market by Mercoid?

A. 55. No, I don't.

Q. 56. Do you yourself make a practice of calling on your customers?

A. 56. I have made a number of calls on the trade.

Q. 57. And do you make it a practice to attend trade exhibitions and conventions where furnaces and furnace controls are being exhibited?

A. 57. Yes, I have; it is limited, but I have attended one exhibition.

Q. 58. You don't remember any others?

A. 58. Let's see, no, I believe the Heating and Ventilating Show in Cleveland last year was the first exhibition which I attended.

Q. 59. Do you know whether the Mercoid fan limit control M-80, introduced here as M-H Exhibit 1, was on exhibition there?

A. 59. I can't recall any; it seems to me that the Minneapolis-Honeywell and two or three of our competitors, other competitors had practically all of the exhibited, installed controls there.

Q. 60. You don't remember seeing a control there of this kind?

A. 60. I don't remember seeing a control of that 1248 kind in that exhibition.

Q. 61. Were any of Mercoid's controls exhibited there?

A. 61. Yes, we had an exhibit there.

Q. 62. Well, then, you saw M-H Exhibit 1 there?

A. 62. Yes, sir.

Q. 63. In your own exhibit?

A. 63. That is right.

Q. 64. Was it installed in a furnace?

A. 64. No, sir.

Q. 65. Does The Mercoid Corporation or Mr. McCabe's organization that he has talked about, carry on schools for salesmen or for customers?

A. 65. Not to my knowledge.

Q. 66. Have you ever since you have been connected with The Mercoid Corporation seen one of these Mercoid fan limit controls, M-H Exhibit 1, installed in a furnace?

A. 66. Yes.

Q. 67. Where?

A. 67. Well, this was in a private dwelling out in Evanston in one of the subdivisions out there, employing, as I remember, a gas fired furnace for heating purposes; I couldn't tell you—I couldn't go and show you the installation today, however, to save my life.

Q. 68. Do you know who made the installation?

A. 68. No, I don't.

1249 Q. 69. Did you know then?

A. 69. No.

Q. 70. Was it in a basement?

A. 70. Yes.

Q. 71. Was that installed according to the wiring diagram of Illustration No. 7 or of Illustration No. 8?

A. 71. I couldn't tell you, I wouldn't know.

Q. 72. Would you be able to tell even if you looked at the installation?

A. 72. Well, I guess I didn't comment on it. I am not an engineer, my knowledge would be strictly limited.

Q. 73. Have you ever, so far as your memory serves you, seen any installation of controls in a furnace where you knew that when the limit control went off, the fan could still operate?

By the Witness: Will you state that question again?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 73. My answer is that I would not know.

By Mr. Bair:

Q. 74. Have you ever seen any other installations of the M-80 except the one you mentioned, in Evanston?

A. 74. Well, I possibly have; that one is distinct in my mind, in the sense that I could swear that it was in

1250 stalled in a furnace and set up to go. We go into these furnace manufacturers often on selling trips, but it is a rare thing that you see these installations; they may be back in their Engineering Departments, and perhaps you don't get by the Purchasing Agent in the front office, to have many of those opportunities. I would say that I don't recall any such instances.

Q. 75. You have been present here during the examination of Mr. McCabe?

A. 75. Yes, sir.

Q. 76. When your salesmen make a sale of the combina

tion fan and limit control, do they instruct the dealer or the purchaser as to how that control is to be installed?

A. 76. Well, they would in all probability refer to the wiring diagram which is in the installation bulletin which accompanies the packaged instrument itself, and if he asked any questions they would, to the best of their ability, governed by the installation bulletin, give him the information that he wanted.

Q. 77. You are speaking of the Bulletin L-4 which has been marked M-H Exhibit 1-A?

A. 77. I would like to see the bulletin. (Witness examines M-H Exhibit 1-A). Yes, L-4.

Q. 78. I suppose that when a salesman makes a sale of the M-80 he ordinarily would leave with the customer some L-4 circulars?

1251 A. 78. I am not so sure of that; and I make that statement because I don't know; our salesmen are not in the habit of carrying stocks of installation instructions; they will have an installation—a group of installation instructions with them, in the ordinary case the trade would get that installation bulletin along with the packaged control.

Q. 79. A salesman might use it in his sales talk?

A. 79. Well, naturally.

Q. 80. But he would count on the customer getting it with the product?

A. 80. That is obviously the case.

Q. 81. I see. Now in addition to these bulletins, The Mercoid Corporation sends out what we have referred to here as the Bulletin M-12; here is a photostat of it (handing document to witness).

A. 81. There undoubtedly has been a mailing of that.

Q. 82. And to whom does the Company mail this Bulletin M-12?

A. 82. The bulletins ordinarily would be sent out to a large section of the trade. It is pretty difficult to draw the lines of distinction as to who would be interested in these various controls, so that when we make a mailing of them we do not necessarily confine ourselves to any group.

Q. 83. I note here on the particular copy of Bulle-
1252 tin M-12 that I have, a legend, "32 M-6-37", what does that mean?

A. 83. May I see it, please?

Q. 84. (Handing document to witness). Does that mean that 32,000 of those were printed in 1937?

A. 84. I think that would be a fair assumption; that is what I generally take that to mean.

Q. 85. Was The Mercoid Corporation putting out Bulletin M-12 when you became associated with the Company?

A. 85. Well, it was the current bulletin, all right, whether they were sending any out in the mail at that time, I don't know.

Q. 86. Do you know whether they are sending them out now?

A. 86. My answer to that would be that the M-12 would be sent out only in case there were a request for the bulletin.

Q. 87. Would you print 32,000 of them on the theory that you would get 32,000 requests; how would the customer or the inquirer learn about these bulletins in order to make a request?

A. 87. Well, he might write in and say, "Do you have any published circulars?"—on the M-80 and the other controls we build for the warm air field—"If you have got them, send me a supply."

Q. 88. Is Bulletin M-12 a part of a catalog?

1253 A. 88. It is not.

Q. 89. Now, what do you send to customers when they don't have anything, when you are soliciting, to solicit the business and to keep your name before them?

A. 89. We would ordinarily get a request to secure a standard catalog.

Q. 90. And does that standard catalog include anything which is substantially the equivalent of Bulletin M-12?

A. 90. I refer you to Page 19 of the Catalog No. 400, in which there is a description of the Type M-80 combination fan and limit warm air controls; they both contain pictures of the controls themselves—it would take quite some comparison to find the points of identity as far as the subject matter is concerned.

Q. 91. Now when you get a new customer or a new dealer for the combination fan and limit control, is there any other literature you send him for instructing him as to how to install it aside from the Bulletin M-12 and the Bulletin L-4 that we have talked about?

A. 91. There might very well be; however, it would require a search of our records to answer that question.

Q. 92. Well, as President of the Company, don't you know?

A. 92. The reason I make that answer is simply this: There are a lot of different ways in which to wire up this

control, and it is quite possible, as I have stated, that,
1254 as you go through the correspondence dealing with specific inquiries regarding them, that you would find differences between suggested wiring diagrams here, or wiring diagrams which would be presented, which as President I would not necessarily comprehend as to all of those situations.

Q. 93. Well, aside from special cases, are there any standard pieces of literature aside from these two that I have mentioned, that are send out to buyers of the combination fan and limit control?

A. 93. (No response.)

Q. 94. Perhaps I should include also this catalog.

A. 94. I believe that would be our standard procedure.

Q. 95. So that the Catalog No. 400 and the Bulletin M-12 and the Bulletin L-4 represent the standard literature that you send out to customers or prospective customers for the combination fan and limit control?

A. 95. That is correct.

Q. 96. At the show that you spoke of, at which you were present, were these three pieces of literature we have just spoken of last, or any of them, available for the public at the Mercoid Exhibit?

A. 96. We had catalogs there, and I cannot tell you with accuracy whether we had any—we had either the L-4 or the M-12, I should think that we might have had some of
1255 the M-12's, I doubt that we would had any installation booklets.

Q. 97. I take it that you know generally that some one of these three pieces of literature, or perhaps all of them, are available to the public and are handed out wherever Mercoid controls of the kind of the combination fan and limit control type are on show?

A. 97. That is an obvious conclusion.

Q. 98. Will you tell us whether your salesmen help your customers to get the American Gas Association approval of installations with the M-80 in the customer's furnace?

By the Witness: Ask me that question again; state your question.

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 98. Well, I recall an occasion where in connection with the M-80 selling, the question came up as to whether A.G.A. approval could be gotten; what part the salesman

might have taken in securing that approval or paving the way for the approval, I would not be able to answer.

By Mr. Bair:

Q. 99. You haven't seen any reports or talked to any salesman about it?

A. 99. Yes, I have seen a report where the question was up as to A.G.A. approval.

1256 Q. 100. And do you recall the nature of that report?

A. 100. No, I don't recall the nature of it, except that in the furnace field and under the routine of the American Gas Association, I understand that the furnace must go to the A.G.A. and have a combination fan and limit switch installed and passed or approved of, whatever the term is that is used by the American Gas Association.

Q. 101. Do you recall whether or not in that particular instance that approval was secured?

A. 101. Well, I must conclude that the approval was secured because we have sold the company some M-80's.

Q. 102. Do you know whether the installation in that case involved the arrangement of Illustration 7 or Illustration 8 recommended in Bulletin L-4?

A. 102. I don't, I don't know what the A.G.A. testing routine is.

Q. 103. Is there anything about the situation in that case that would lead you to believe that the installation was other than that recommended in Bulletin L-4?

A. 103. I couldn't answer that, for the same reason that I am not informed on the other.

Q. 104. Do you still sell that customer?

A. 104. Yes.

Q. 105. And do you still hand him the bulletin—send that customer the Buletin L-4 with the M-80?

1257 A. 105. It obviously is packed with the control.

Q. 106. Where was that installation?

A. 106. Well, I—

By the Witness: Will you state the question?

(The pending question as above recorded was read by the Reporter.)

By the Witness:

A. 106. (Continuing) I don't know where that installation was; I did not mention an installation; I mentioned a customer.

By Mr. Bair:

Q. 107. Well, you would assume that the test was made according to the standard method of the A.G.A.?

Q. 107 I must assume that.

Q. 108. I see, and then it would have been made in Cleveland?

A. 108. Yes.

Q. 109. Do you recall the name of the salesman?

A. 109. Well, I recall the name of the salesman that made the report to our office, Mr. R. F. Fisher.

Q. 110. Is he still with you?

A. 110. Yes, he is.

Q. 111. Do you have any objection to telling us the name of the customer?

1258 A. 111. Well, I would like to ask our counsel on that point.

By Mr. Moore: What was the question?

By the Witness: He asked if I would tell the name of the customer.

By Mr. Moore: There would be no objection.

By the Witness:

A. 111. (Continuing.) Lennox Furnace Company of Syracuse.

By Mr. Bair:

Q. 112. That is the same company as the Lennox Furnace Company of Marshalltown, Iowa, is it not?

A. 112. I am not entirely qualified to say on that; I have understood that they were two different corporations.

Q. 113. Do you also understand that they are both owned by the Norrises?

A. 113. No doubt. We have sold one, we can't sell the other.

By Mr. Bair: Direct Examination closed.

By Mr. Moore: No cross-examination.

By Mr. Fuller (Notary Public): Gentlemen, do you wish the witness to read and sign his deposition, or is the reading and signing waived?

By Mr. Bair: Signature waived.

By Mr. Moore: Signature waived; we will look it over.

1259 And on, to wit, the.....day.....came the .....by.....attorneys and filed in Clerk's office of said Court certain Deposition of Barr Minneapolis Honeywell Exhibit #33 in words and figures following, to wit:

1260 *Direct Examination by Mr. Will Freeman.*

D. Q. 1. Will you please state your full name?

A. Alfred W. Barr.

D. Q. 2. Where do you reside?

A. In Boston, Massachusetts.

D. Q. 3. And how long have you been in Boston?

A. Since 1936.

D. Q. 4. By whom are you employed at the present time?

A. The Penn Electric Switch Company of Goshen, Indiana.

D. Q. 5. In what capacity?

A. Branch Manager.

D. Q. 6. How long have you been employed by the Penn Electric Switch Company?

A. Approximately four years.

D. Q. 7. By whom were you employed prior to that time?

A. The Mercoid Corporation.

D. Q. 8. How long were you with the Mercoid Corporation?

A. Approximately twelve years.

D. Q. 9. In what capacity were you employed by the Mercoid Corporation?

1261 A. Sales.

D. Q. 10. What territory did you cover in the years just preceding your termination of the employment with that company?

A. New England and part of New York state.

D. Q. 11. From whom did you get your instructions with respect to sales policies of the Mercoid Corporation?

A. From the sales manager and engineer.

D. Q. 13. Will you name some of the individuals with whom you had contact at the Mercoid Corporation, and from whom you received information with respect to sales matters?

A. J. W. Owens, R. H. Chadwell, Albert Schultz, Walter Colterjohn, J. N. Derby. I think that should be sufficient.

D. Q. 14. You mention J. W. Owens. Is that the gentleman who is sitting next to you at the present time?

A. It is.

D. Q. 15. Do I understand that you called on customers and prospective customers with respect to making sales of products manufactured by the Mercoid Corporation?

A. That is so.

1262 D. Q. 23. Are you familiar with the combination furnace fan and limit control put out by the Mercoid Corporation, known as its Type M-80?

A. I am familiar with that.

D. Q. 24. Do you know when, about, the company came on the market with its Type M-80 control?

A. Approximately the end, I would think, of 1936 or beginning of 1937.

D. Q. 25. About 3 or 4 years ago—is that correct?

A. That's right.

D. Q. 26. Do you recall seeing any literature with respect to the Type M-80 put out by the Mercoid Corporation?

A. Yes I did.

D. Q. 27. I hand you a bulletin marked "M-12" and will ask you to look at the Bulletin and tell us whether or not it discloses the control of the kind known as "M-80"?

A. This does describe it.

D. Q. 28. And you received such literature from the company?

A. Yes, I did.

D. Q. 29. And such literature included the wiring diagrams which appear upon the back of the bulletin entitled "Combination Control Wiring Diagrams", is that correct?

A. Yes, that's correct.

1263 D. Q. 35. Did you have occasion to explain in detail the sequence of operation of the M-80 to customers or prospective customers?

1264 A. Yes, I would have to explain this operation.

D. Q. 36. And did you follow the electric hook-ups or wiring diagrams suggested by the Mercoid Corporation.

A. Yes.

D. Q. 37. Your instructions were received from the Mercoid Corporation. Is that correct?

A. That is correct.

D. Q. 38. And as its sales representative you passed on to customers the hook-up for the Type M-80 as recommended and suggested by the Mercoid Corporation?

A. That is so.

D. Q. 39. And is that the usual policy that you followed in all of the years that you were with Mercoid Corporation: that is, in recommending use of the controls in accordance with hook-ups suggested by the company?

A. We would naturally discuss the correct method of hooking up controls and wiring them correctly.

D. Q. 40. And "wiring them correctly" meant following the recommendations of the Mercoid Corporation?

A. Yes.

D. Q. 41. And that has been substantially standard practice in all the years that you were with the company?

A. Yes, that is so.

1265 D. Q. 42. And that was the same practice that you followed in connection with the Type M-80?

A. That, and any other control.

D. Q. 43. Have you had occasion to answer service calls or act as a trouble shooter in connection with the sale of controls made by the Mercoid Corporation?

A. Yes.

D. Q. 44. When answering a service call, what did you first do?

A. Make certain that the service man pays a visit to the installation at the same time, so that he can be definitely instructed in the manner of application of the equipment.

D. Q. 45. What do you mean by "definitely instructed with respect to the manner of installation of the equipment"?

A. Quite frequently a service call will emanate from incorrectly wiring control equipment.

D. Q. 46. And when you called with the service man on one of these trouble cases, what did you do?

A. Asked him some questions.

D. Q. 47. And what did you do with respect to the installation itself?

A. Checked over all the controls involved on this particular installation.

1266 D. Q. 52. And you checked the installation to see whether or not it has been made following the wiring diagrams covering that particular control or set of controls? Is that correct?

A. That's correct.

D. Q. 53. And I take it that at the same time you checked with the service man on the job to determine whether or not he is familiar with the hook-ups recommended by the Mercoid Corporation? Is that correct?

A. Invariably, we endeavored to give him the fullest co-operation and instruct him in the manner and types of applications of control equipment.

D. Q. 54. By "types of application" do you mean the hook-up arrangements following wiring diagrams furnished by the Mercoid Corporation?

A. That, and also in the correct application of the product.

D. Q. 55. And that likewise is in accordance with the suggested use, as recommended by the Mercoid Corporation?

A. That is so.

1267 By Mr. Freeman: You may cross-examine.

By Mr. Moore: There will be no cross-examination.

1268 By agreement of counsel and with the consent of the witness, signature of the witness has been waived.

It is also stipulated that the deposition may remain in the custody of counsel for defendant and produced at the trial.

End of direct examination of witness Alfred W. Barr.

UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

I, Kenneth J. Carrick, Clerk of the United States Circuit Court of Appeals for the Seventh Circuit, do hereby certify that the foregoing printed pages contain a true copy of Volume one of the printed record, which together with Volume two, constitutes the record, in causes Nos:

The Mercoid Corporation,
Plaintiff-Appellee,

8019 *vs.*

Minneapolis-Honeywell Regulator Company,
Defendant-Appellant.

The Mercoid Corporation,
Plaintiff-Appellant,

8020 *vs.*

Minneapolis-Honeywell Regulator Company,
Defendant-Appellee.

as the same remains upon the files and records of the United States Circuit Court of Appeals for the Seventh Circuit.

In Testimony Whereof I hereunto subscribe my name and affix the seal of said United States Circuit Court of Appeals for the Seventh Circuit, at the City of Chicago, this 23rd day of April, A. D. 1943.

Kenneth J. Carrick,

(Seal) *Clerk of the United States Circuit Court of Appeals for the Seventh Circuit.*

Vol. II

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1943

No. 58

THE MERCOID CORPORATION, PETITIONER,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

No. 59

THE MERCOID CORPORATION, PETITIONER,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

ON WRITS OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SEVENTH CIRCUIT

PETITION FOR CERTIORARI FILED MAY 3, 1943.

CERTIORARI GRANTED JUNE 7, 1943.

VOL. II pp. 657 to 1241.

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IN THE

Supreme Court of the United States

OCTOBER TERM, A. D. 1942.

No.

THE MERCOID CORPORATION,

Petitioner,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SEVENTH CIRCUIT.

IN THE

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ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SEVENTH CIRCUIT.

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FOR THE SEVENTH CIRCUIT.

No. 8019.

THE MERCOID CORPORATION,
Plaintiff-Appellee,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Defendant-Appellant.

No. 8020.

THE MERCOID CORPORATION,
Plaintiff-Appellant,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Defendant-Appellee.

Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division.

TRANSCRIPT OF RECORD FILED MAY 23, 1942.
PRINTED RECORD.

IN THE

UNITED STATES CIRCUIT COURT OF APPEALS

FOR THE SEVENTH CIRCUIT.

No. 8019.

THE MERCOID CORPORATION,
Plaintiff-Appellee,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Defendant-Appellant.

No. 8020.

THE MERCOID CORPORATION,
Plaintiff-Appellant,

vs.

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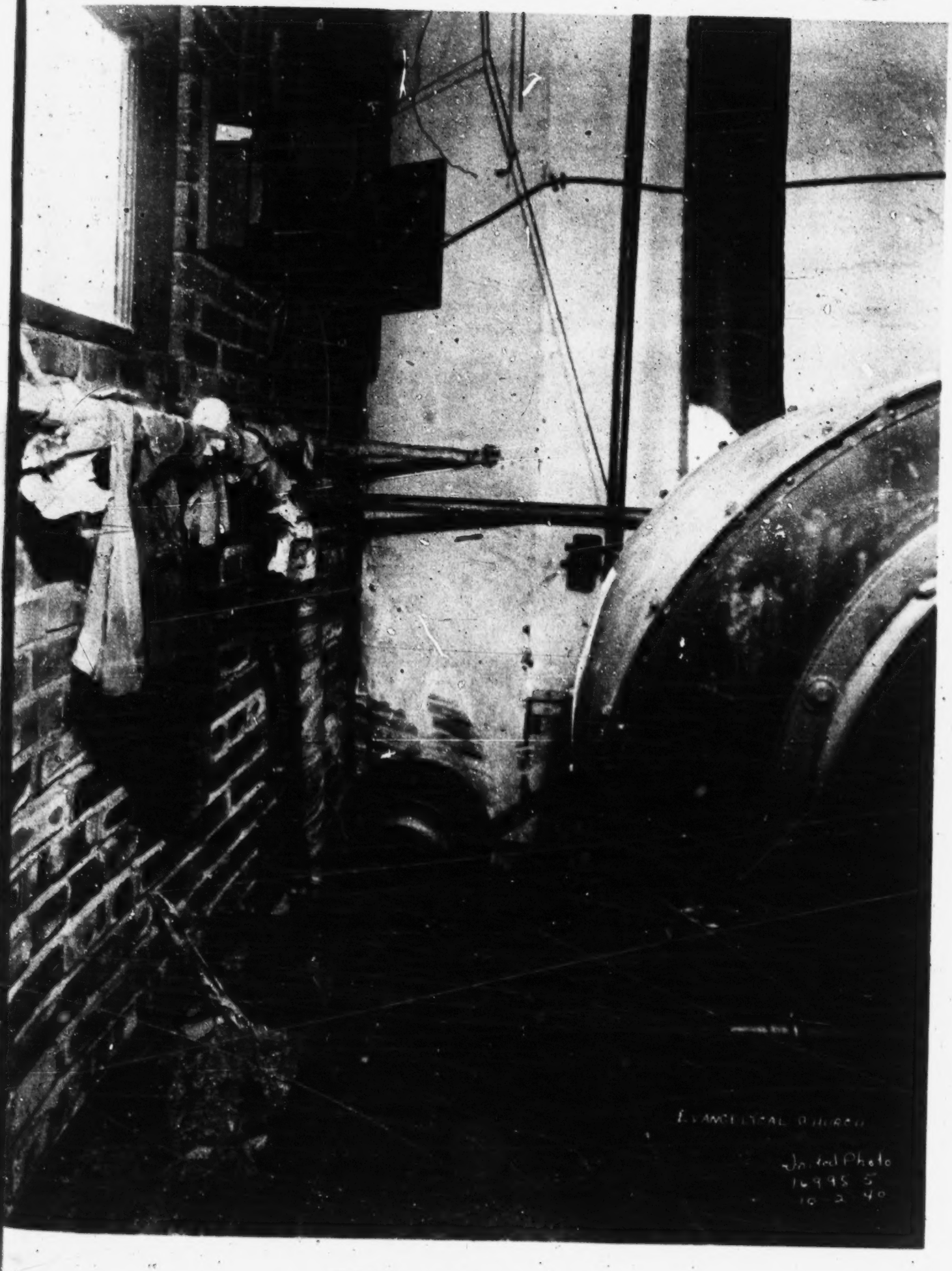
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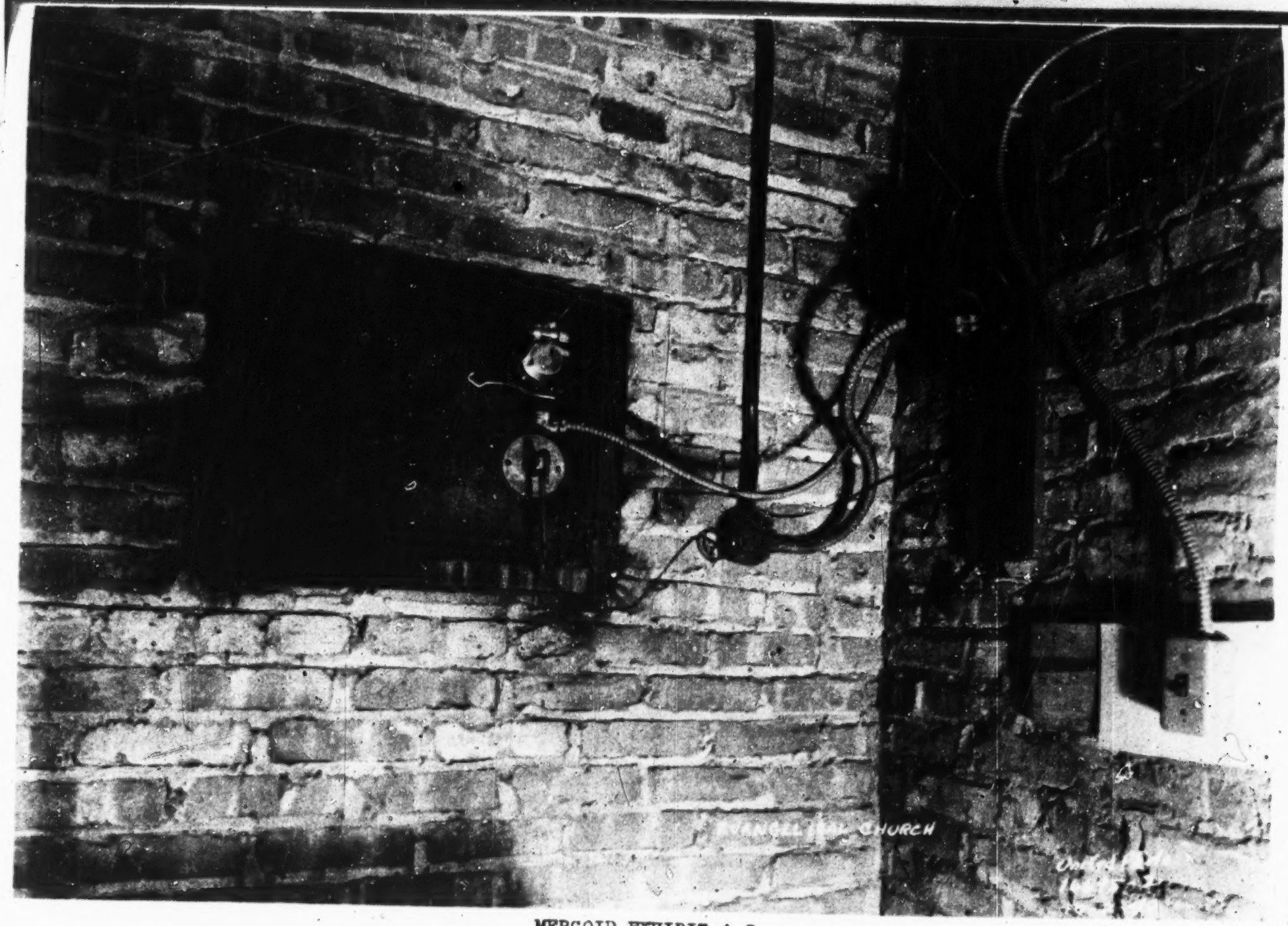
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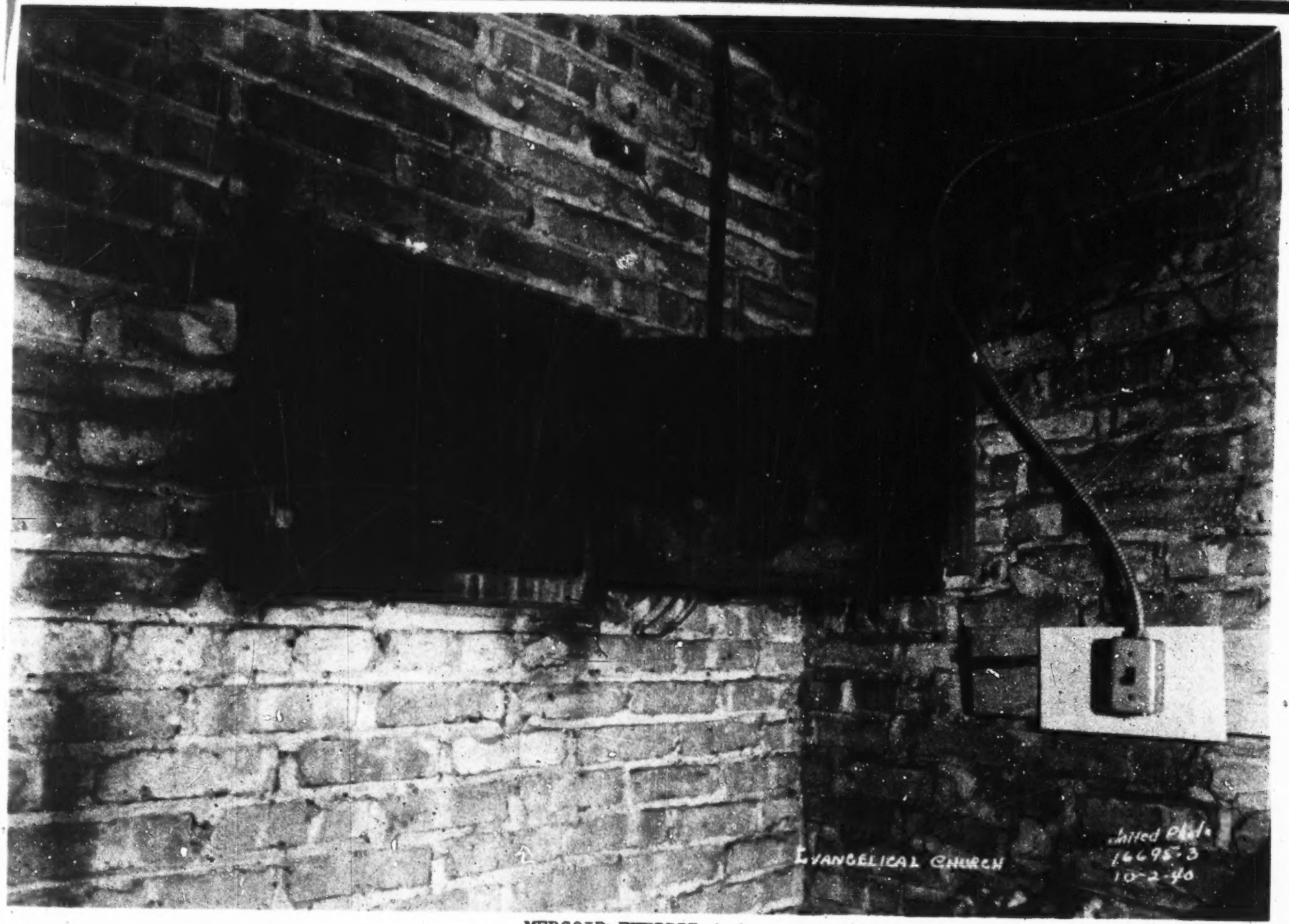
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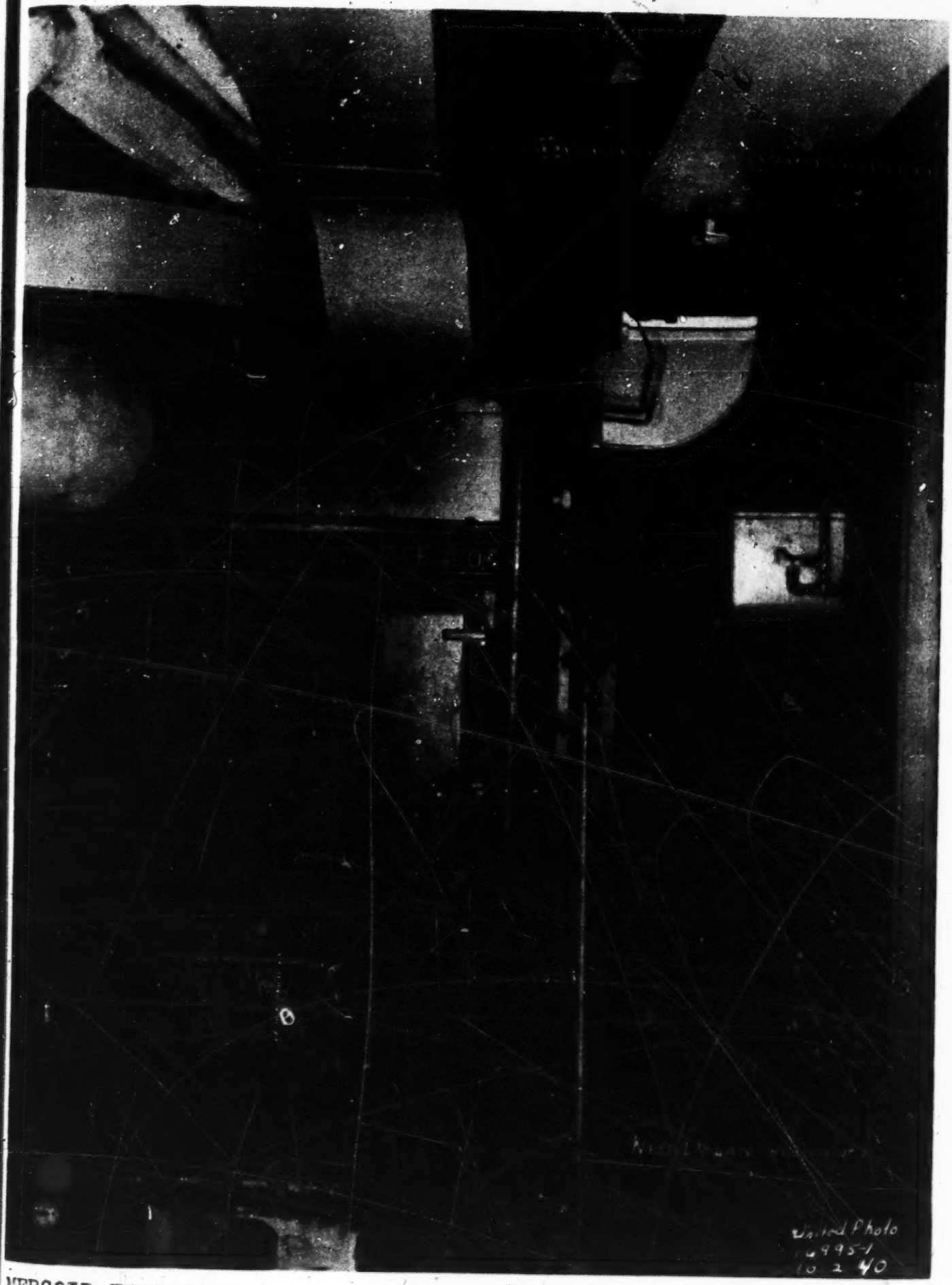
MERCOID EXHIBIT A-2



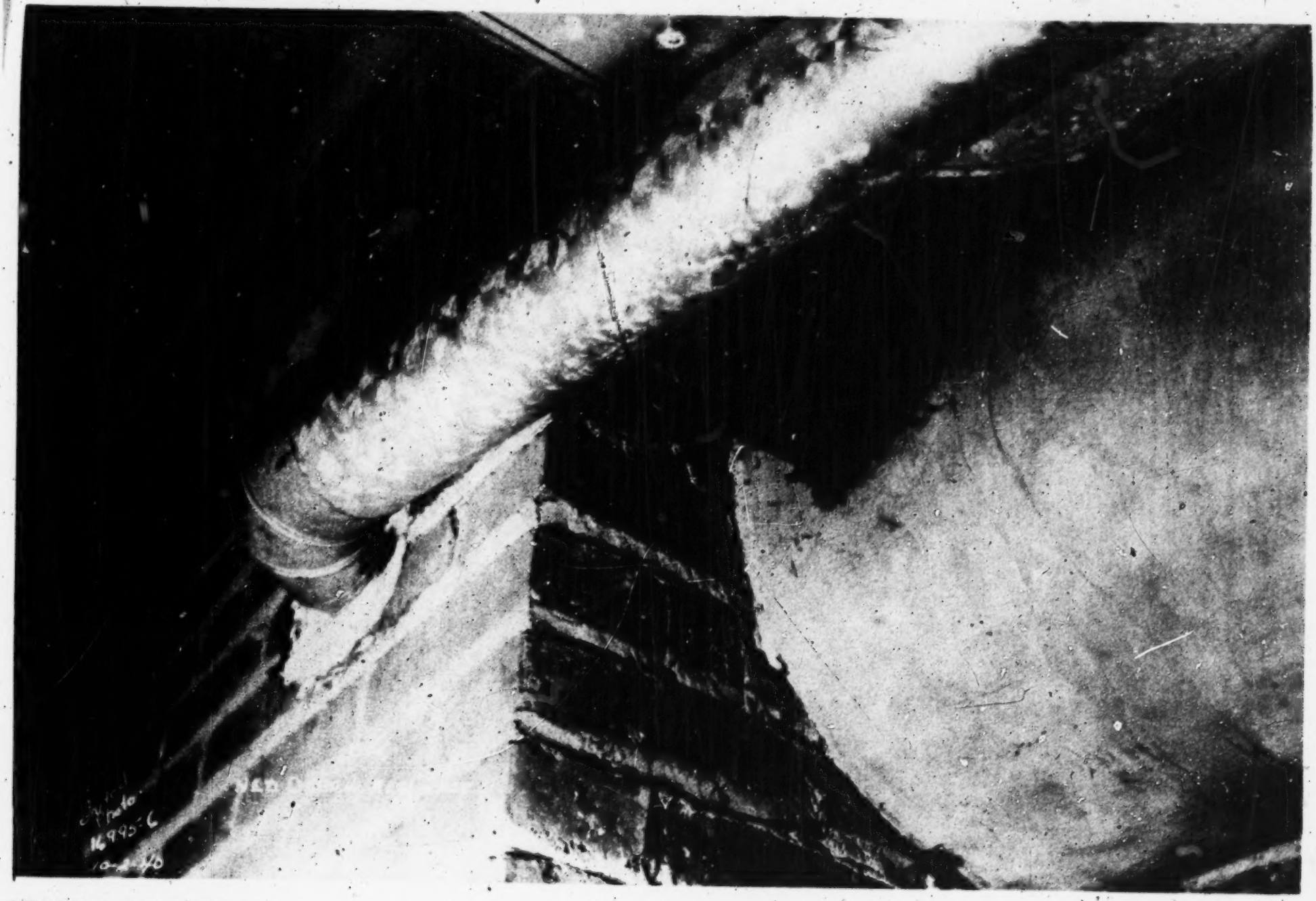
MERCOID EXHIBIT A-3



MERCOID EXHIBIT A-4



MERCOID EXHIBIT B-1



MERCOID EXHIBIT B-2

WILLAMETTE GAS-O-MATIC HEATING CORPORATION
Customer's Invoice Duplicate—Accounting Dept. Copy

Shipping Order No. 2175

Invoice No. 2051

Filled by

Ck'd by

Marks 8-3313

B/L Attached

Entered in Sales Register

Compared with Shipping Copy

Prices & Cls. Ch.

Entered in Sales Control

Invoice Completed

Date Billed

Bill Cls.

Date JUL 10 1936

CREDIT APPROVED

DATE

BY Credit Man.

SHIPPING DATE

F. O. B.

VIA

BACK ORDER No.

[illegible] FRONT STREET,

ITEM DESCRIPTION	PRICE	AMOUNT
[illegible]MATIC 1200 BTU	322	
[illegible]NTROL	153	
[illegible]SAFETY		
[illegible]STAT	475 00	
[illegible]GALLON TANK	~~50 00~~	
	~~125 00~~	
[illegible] MODEL G		
[illegible] INSTALLED AT [illegible]CE		

Shipping Weights

Net Total

Tare

Net

Net Sales

MERCOID EXHIBIT C-1

WILLIAMS OIL-O-MATIC HEATING CORPORATION
BLOOMINGTON, ILLINOIS

No. 11669 P.

Invoice No.

Filled by

O. K'd by

Marks

B-L Attached

Extended and Footed By | Stk. Def'd Entered By | Compared with Billed Copy

Extensions and Totals Chkd. By | Stk. Entry Changes (if any) | Shipment Certified — Price & Cl. Chk.

Invoice Billed By | Date Shipped — Shipper

SHIPPING DATE

F. O. B.

Evangelical Freidens Church

VIA

BACK ORDER No.

# ARTICLES Not Ordered	Ordered	Shipped	TERMS	PRICE	AMOUNT
1	1		Federal Mercoid Thermostat		36.00
1	1		Federal Mercoid Furnace Control		36.00
1	1		Special Federal Mercoid Control		46.00
1	1		Allen-Bradley Relay Switch 110 60 Cycle 3 H.P.		31.00
				64-1	149.00

INVOICE DUPLICATE

Number Numbered in Billed Lbs. As Packed Weight | Initial Order No. | Shipping Weight | Priced By

Price and Cl. Chk. | GROSS | TARE | NET

MERCOID EXHIBIT C-2

2/12/30

23673

31068

TED

1930

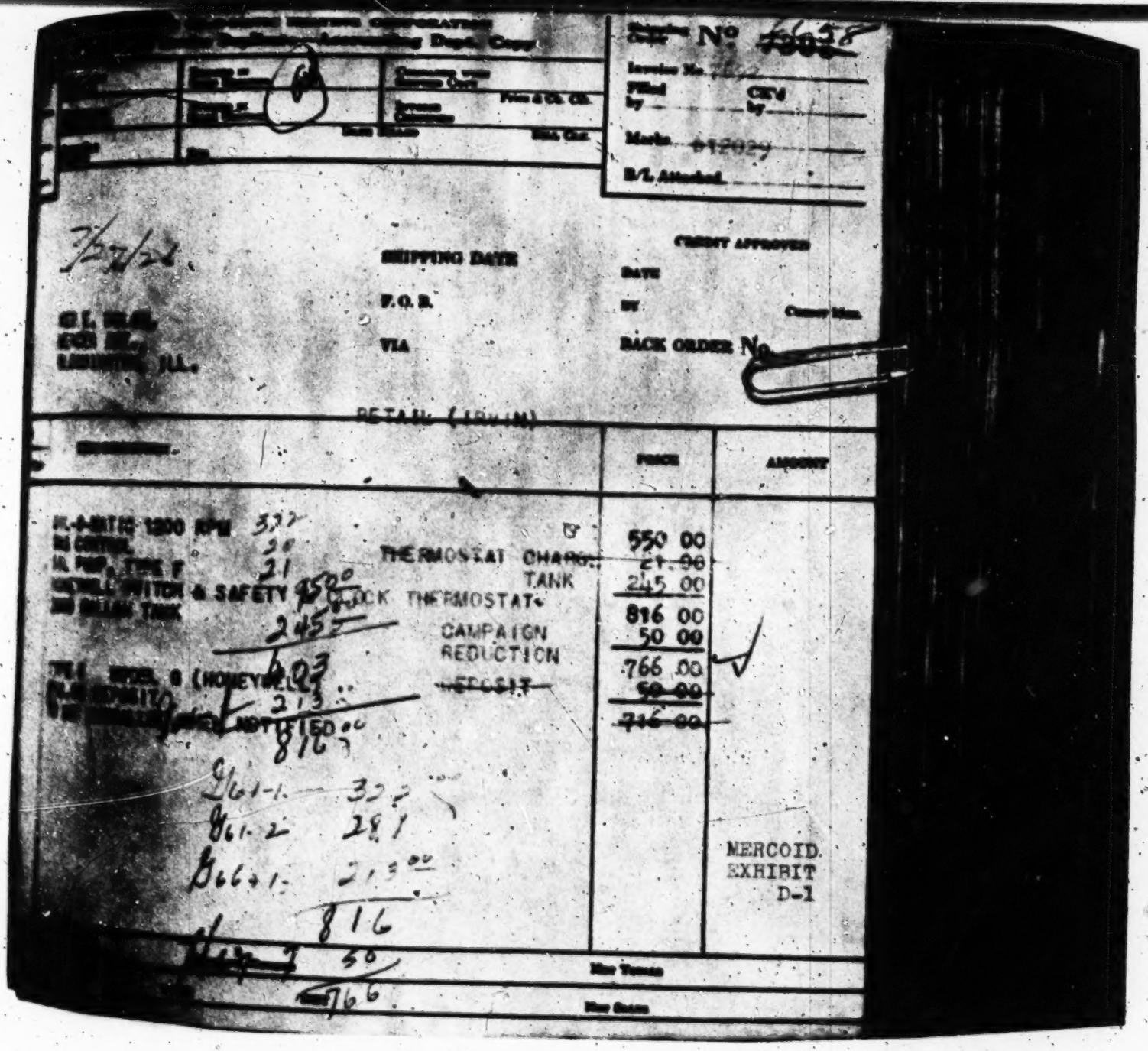
EVANGELICAL CHURCH
502 N. FRONT ST.
CITY.

CHARGE FOR REPLACING MERCOID
FURNACE CONTROL FOR FURNACE FAN

14 75

MERCOID EXHIBIT C-3

673



No. 4638

7/27/54

SHIPPING DATE

F.O.B.

VIA

CREDIT APPROVED

DATE

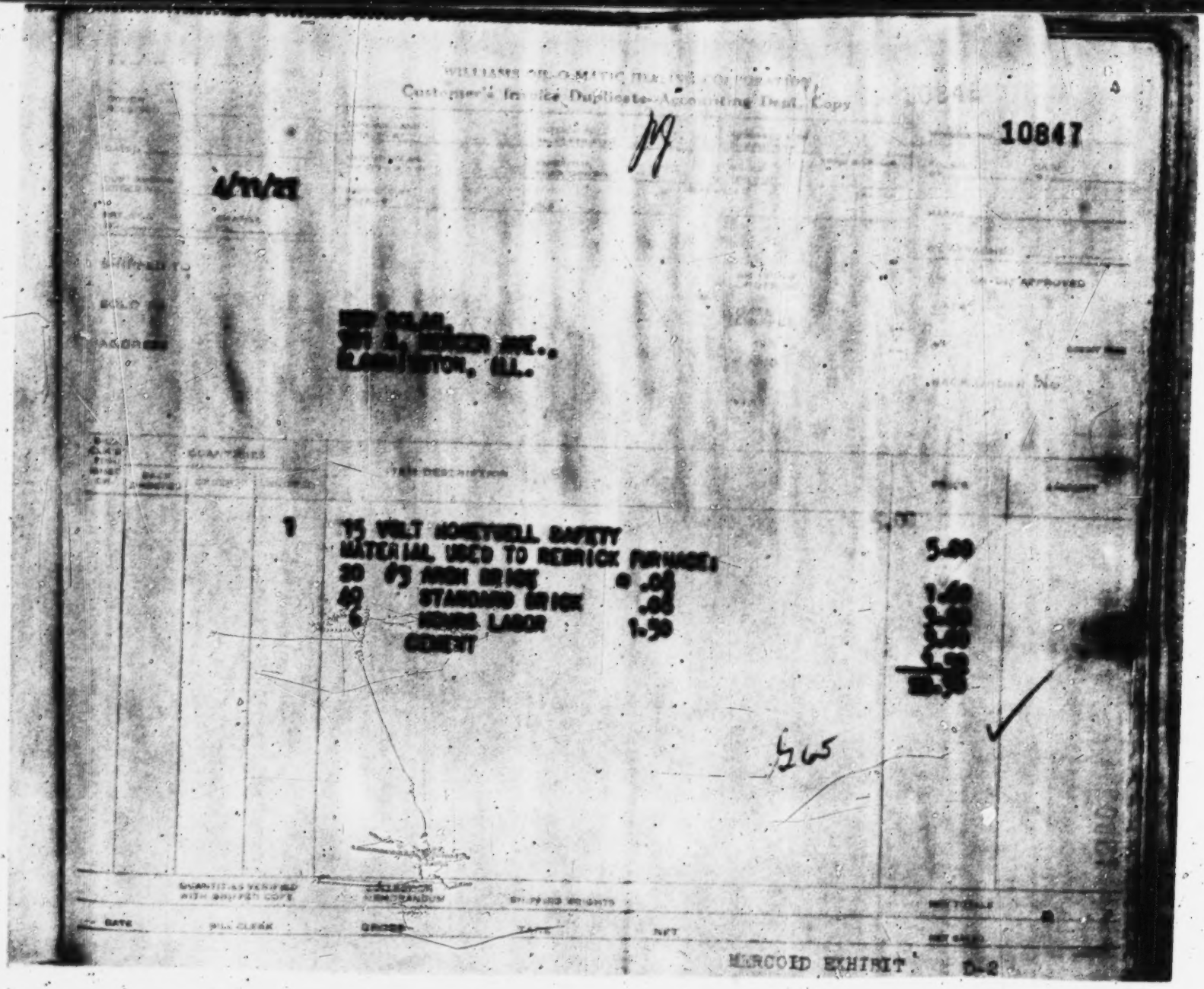
BY

BACK ORDER No.

	PRICE	AMOUNT
4-SPEED 1200 RPM 332		
21		
THERMOSTAT CHARG..	550 00	
TANK	21 00	
& SAFETY 450	245 00	
LOCK THERMOSTAT	816 00	
245	50 00	
CAMPAIGN REDUCTION	766 00	
213	50 00	
816	716 00	
661-1 32		
661-2 28		
661-1 21.00		
816		
50		
766		

MERCOID EXHIBIT D-1

675



Customer's Invoice Duplicate-Accounting Dept. Copy

10847

1 75 VOLT HONEYWELL SAFETY
MATERIAL USED TO REBRICK FURNACE:
30 M/M FIRE BRICK @ .05
40 STANDARD BRICK .05
6 HOURS LABOR 1.50
CEMENT

5.00

MERCOID EXHIBIT D-2

WILLIAMS OIL-O-MATIC HEATING CORPORATION

NAME NED E. DOLAN

ADDRESS MERCED AVE CITY

SHEET NO.

LIMIT

DATE 1956	ITEM	DEBITS	CREDITS	NEW BALANCE	OLD BALANCE
JUNE 1	DEP		50 00	50 00	50 00
JULY 27	INV.769	766 00		716 00	

ACCTD EXHIBIT 7-E

WILLIAMS OIL-O-MATIC HEATING CORPORATION

NAME EVANGELICAL FRIEDENS CHURCH

ADDRESS FRED. HEISE, TREAS.

DATE 1925	ITEM	DEBITS	CREDITS	NEW BALANCE	OLD BALANCE
MAY 25	DEPOSIT		50 00 CR	50 00	50 00
JULY 18	OIL O MATIC	475 00		425 00	425 00
NOV 30	CASH		425 00	00	
1926 FEB 3	INV.5941	35 00		35 00	35 00
MAR 2	C/M77		35 00	00	
JULY 7		35 00		35 00	

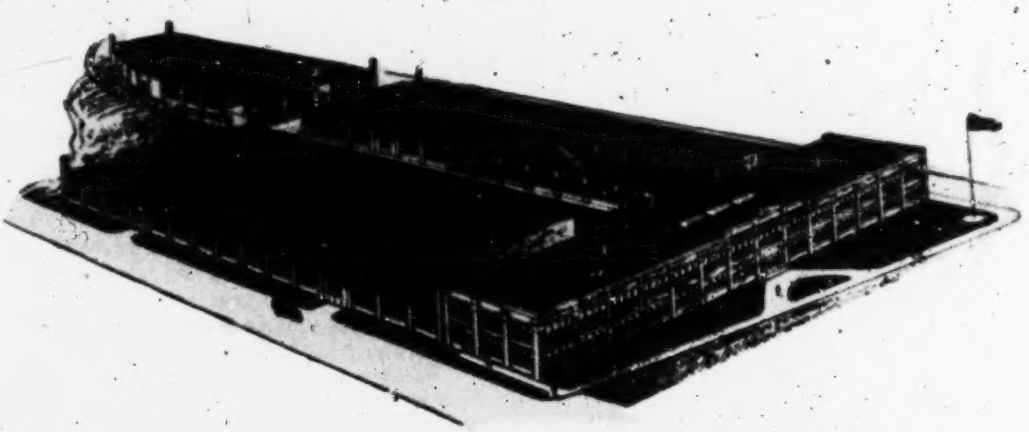
MERCOID EXHIBIT D-4

181

INSTALLATION
and
SERVICE MANUAL

Revised Edition to Include Model "J" Oil-O-Matic

WILLIAMS OIL-O-MATIC HEATING



"World's Largest Producers of Automatic Oil Burners"

Line drawing from an actual photograph of the Home-Office and Factory of the Williams Oil-O-Matic Heating Corporation, Bloomington, Illinois. Airplane Photo was taken from a height of 800 feet.

MERCOID EXHIBIT E-2

DEALERS INSTALLATION AND SERVICE MANUAL

Installations illustrated protected by patents and patents pending.

GENERAL ALPHABETICAL INDEX

IMPORTANT - See Sheets No. A-236.

A-132 Installation Questionnaire-Important.

BRICKING

NOTE:
End of draft pipe must be 1/2" back from inside face of fire pot wall.

A-55 Abrams Cox Novelty Boiler.
A-46 American Radiator 48" Series Boiler-Front Installation-Special.
A-67 American Direct Fired Unit Heater-Blower Type-Using Relay Switch
A-143 American Solar Heat Generator.
A-179 American Radiator Type "C" Boiler S or W 3611-6.
A-211 American Ideal Oil Burning Boiler.
A-116 Boynton Square Pot Type Sectional Boiler.
A-156 Bros Horizontal Return Tubular Boiler.
A-71 Bryant Gas Boiler.
A-145 Continental Low Water Line Boiler-End Installation.
A-148 Continental Low Water Line Boiler-Front Installation.
B-161 Capitol or Ideal Horizontal Cast Iron Type Sectional Boiler.
A-39 Parquar Hot Air Furnace.
A-207 Pi..zgibbons Ontario Steel Boiler-Series H-36.
A-62 Gurney Boiler-250 Series.
A-185 Hart and Crouse Smokeless Down Draft Boiler.
A-77 Hoe Stereotype Pot Furnace.
A-64 Hot Air Furnace with Cast Iron Fire Pot.
A-154 Hot Air Furnace with Steel Drum Fire Pot.
A-157 Hot Air Furnace with Bee-Hive Shaped Fire Pot.
A-35 Ideal 79" Water Tube Boiler.
A-78 Ideal Boiler with Drop Section or Smoke Oxidizer.
A-164 Ideal Sectional Down Draft Smokeless Boiler.
A-196 Ideal Heat Machine Type "A".
A-170 Kewanee Garbage Burner No. 31.
A-61 Kewanee Straight Draft and Down Draft Boiler.
B-139 Kewanee Water Heating Garbage Burner.
A-187 Kewanee Straight Draft Boiler-Type "K".
A-76 Leffel Scotch Marine Return Tubular Boiler.
A-92 Middleby-Marshall Bake Oven-Model "B".
A-34 Pacific Return Tubular Boiler.
A-63 Pierce Down Draft Boiler.
A-53 Prox Boiler-Rear Installation.
A-195 Reynolds Unit Heat Generator.
A-190 Richmond Model Sectional Boiler-40 Series.
A-159 Round Type Boiler.
A-72 Square or Rectangular Type Boiler.
A-194 Smith Smokeless Boiler No.60.
A-73 Spencer Cast Iron Boiler.
A-160 Spencer Magazine Feed Cast Iron Sectional Boiler-Series 27 & 30"
A-115 Two or Three Burners in One Fire Pot
A-212 Thatcher Furnace Company Progress Boiler-Series 28 & 40"
A-181 Vertical Tubular High Pressure Boiler-Special.
A-127 Weir Wood Furnace.
A-79 Wood Twin Stereotype Pot Furnace.

DEALERS INSTALLATION AND SERVICE MANUAL

Installations illustrated protected by patents and patents pending.

GENERAL ALPHABETICAL INDEX

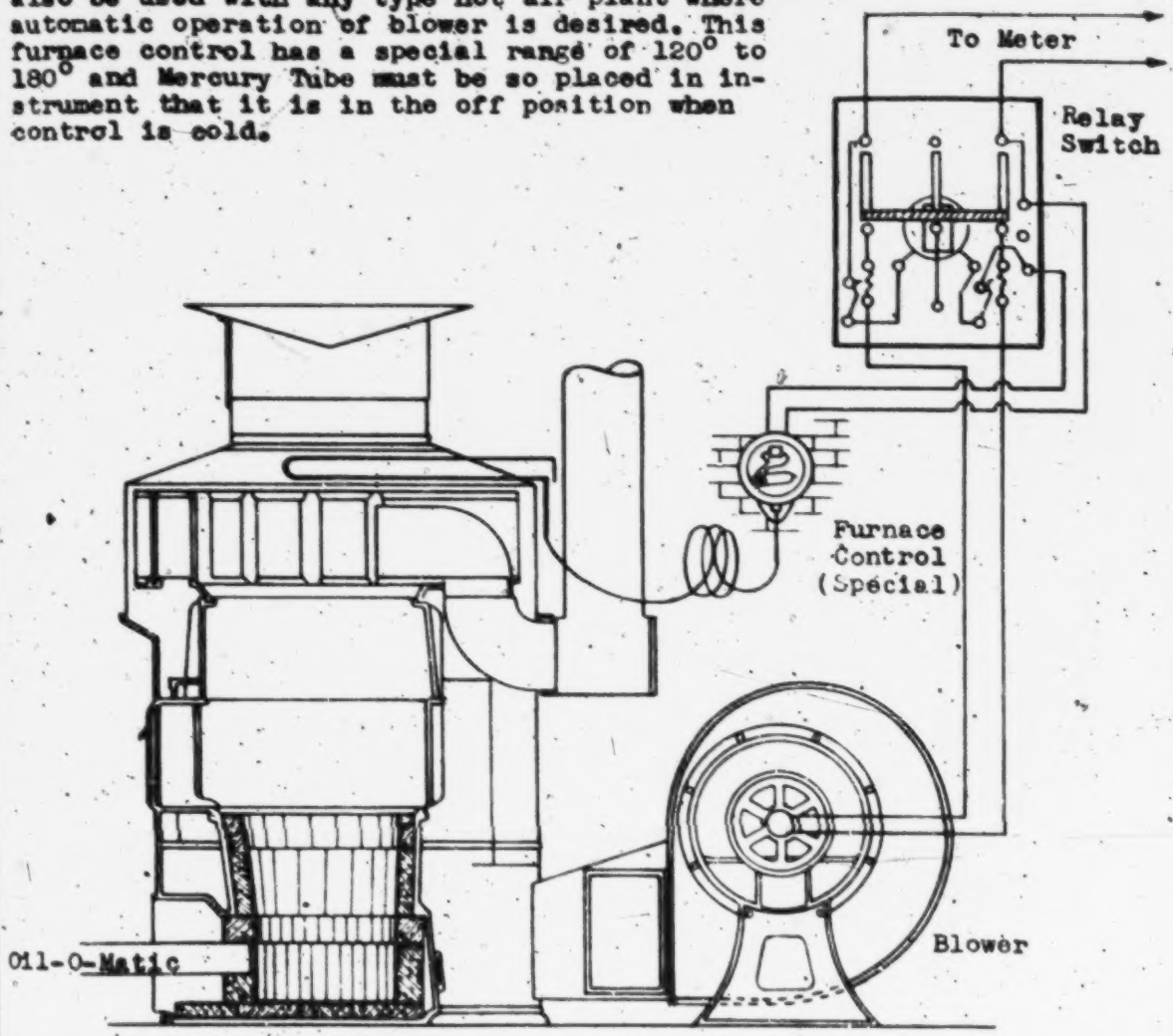
WIRING

A-199 Automatic Heating and Automatic Domestic Hot Water Supply-Steam.
B-47 Automatic Heating and Automatic Hot Water Supply-Hot Water Boiler
A-138 Automatic Heating and Automatic Hot Water Supply-Steam Boiler.
A-202 Automatic Heating and Domestic Hot Water Supply-Steam. For use with a Three-Wire Control.
B-16 Automatic Heating and Automatic Hot Water Supply-Steam.
A-152 D.C. Slip Ring Motor.
A-171 Four Burners in Two Boilers using Relay Switch.
B-126 High and Low Temperature Controls with Oil-O-Matic.
A-85 Honeywell Combustion Safety Control Instructions.
A-48 Lever Arm Vapor Control-One Burner in One Boiler.
A-150 Mercoid Hot Air Furnace Control.
C-129 Model "G" Control Box Heat Unit No.3 Installation Instructions.
A-153 Model "G" Wiring Diagram with Heat Unit No.3.
A-174 Model "G" Honeywell with Mercoid Steam Control.
A-192 Model "G" Type "P" Mercoid Assembly and Wiring complete.
A-193 Model "G" Type "F" Honeywell Assembly and Wiring complete.
C-60 Model "G" Control Box with High Voltage Stack Safety-Three Wire system.
A-133 Two Burners in One Boiler-Steam and Hot Water Control.

WIRING FOR MODEL "J"

JA-225 Model "J" Honeywell Oil-O-Matic.
JA-227 Model "J" Mercoid Oil-O-Matic.
JA-235 Model "J" Mercoid Oil-O-Matic comprising two separate circuits working in conjunction with the stack safety control.

Bricking Diagram showing Blower Type American Direct Fired Unit Heater using Allen Bradley Type J-1552-Form "T" Starting Switch with Mercury Special Hot Air Furnace Control for pilot to start blower automatically at 180° and to stop at 120° furnace temperature. This plan of operation can also be used with any type hot air plant where automatic operation of blower is desired. This furnace control has a special range of 120° to 180° and Mercury Tube must be so placed in instrument that it is in the off position when control is cold.



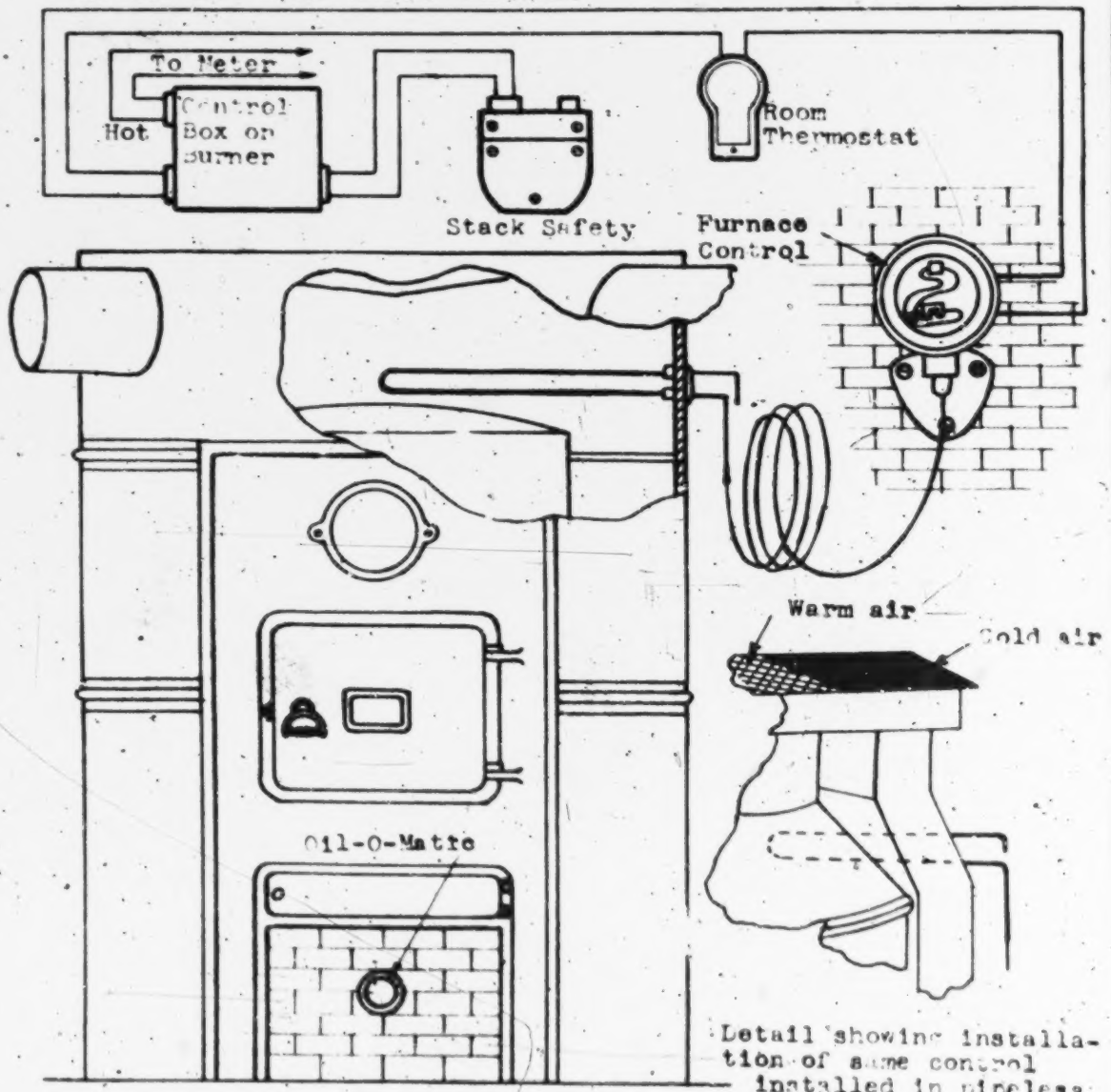
TYPICAL CROSS SECTION OF FIRE POT

DRAWN BY H.W.G.	WILLIAMS OIL-O-MATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS	DATE Oct. 19-26
APPROVED O.H.P.		SHEET NO A 67

PRINTED IN U.S.A.

DIAGRAM SHOWING THE INSTALLATION OF A MERCOID FURNACE CONTROL FOR WARM AIR FURNACES.

Standard Range 250° to 300° F. Range may be adjusted by sliding loaded stem in or out of furnace hood above furnace dome, or by standard adjustment on back. For automatic control on warm air furnace, it acts as safety device to prevent overheating of furnace. Con rol must be installed above the top of the inside dome. This control operates on the same principle as the Federal Mercoid Hot Water Boiler Control.



Detail showing installation of same control installed in pipeless furnace.

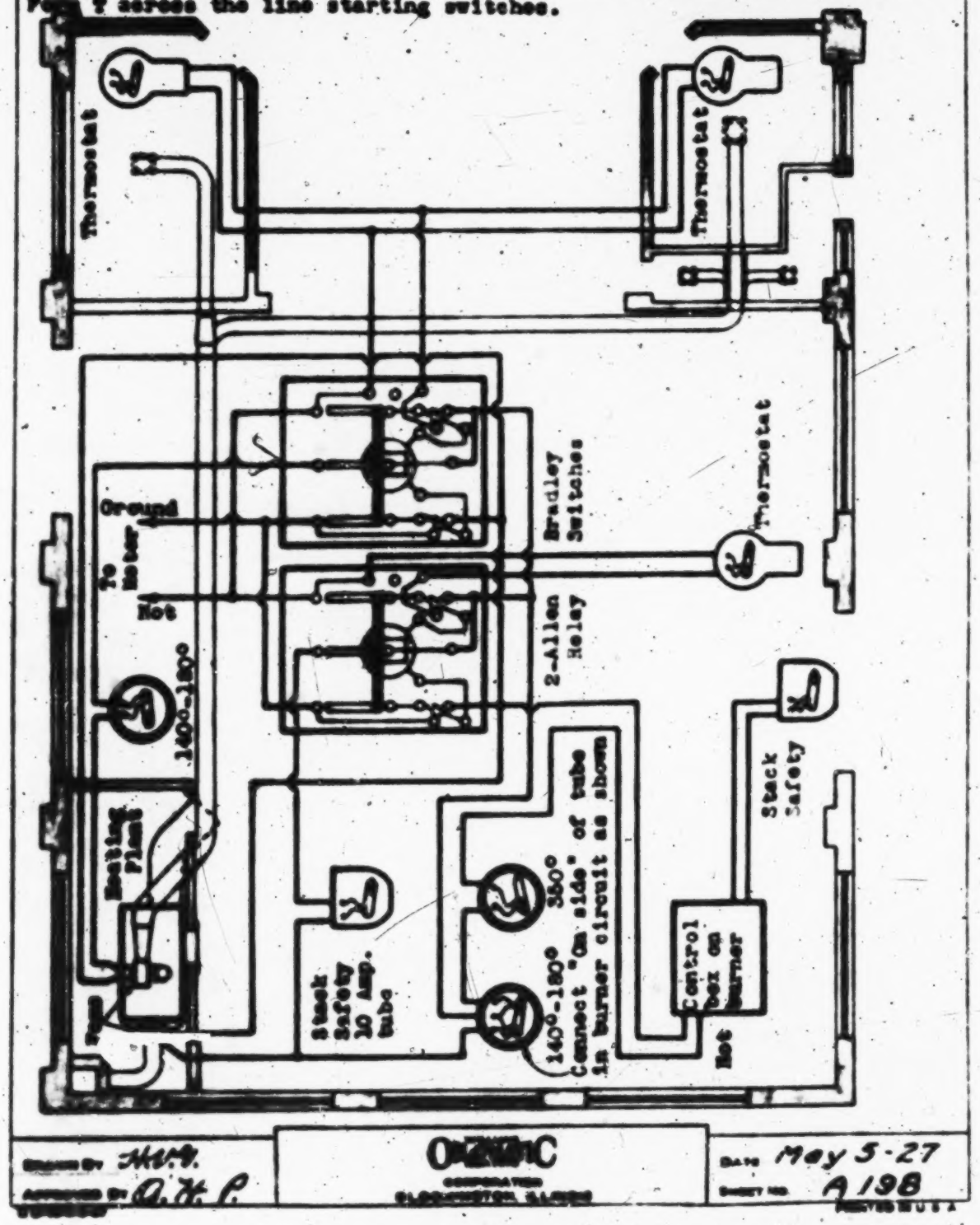
DRAWN BY H.L.G.
APPROVED BY [illegible]

WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

DATE DEC. 24, '25.
SHEET NO A 150

PRINTED IN U.S.A.

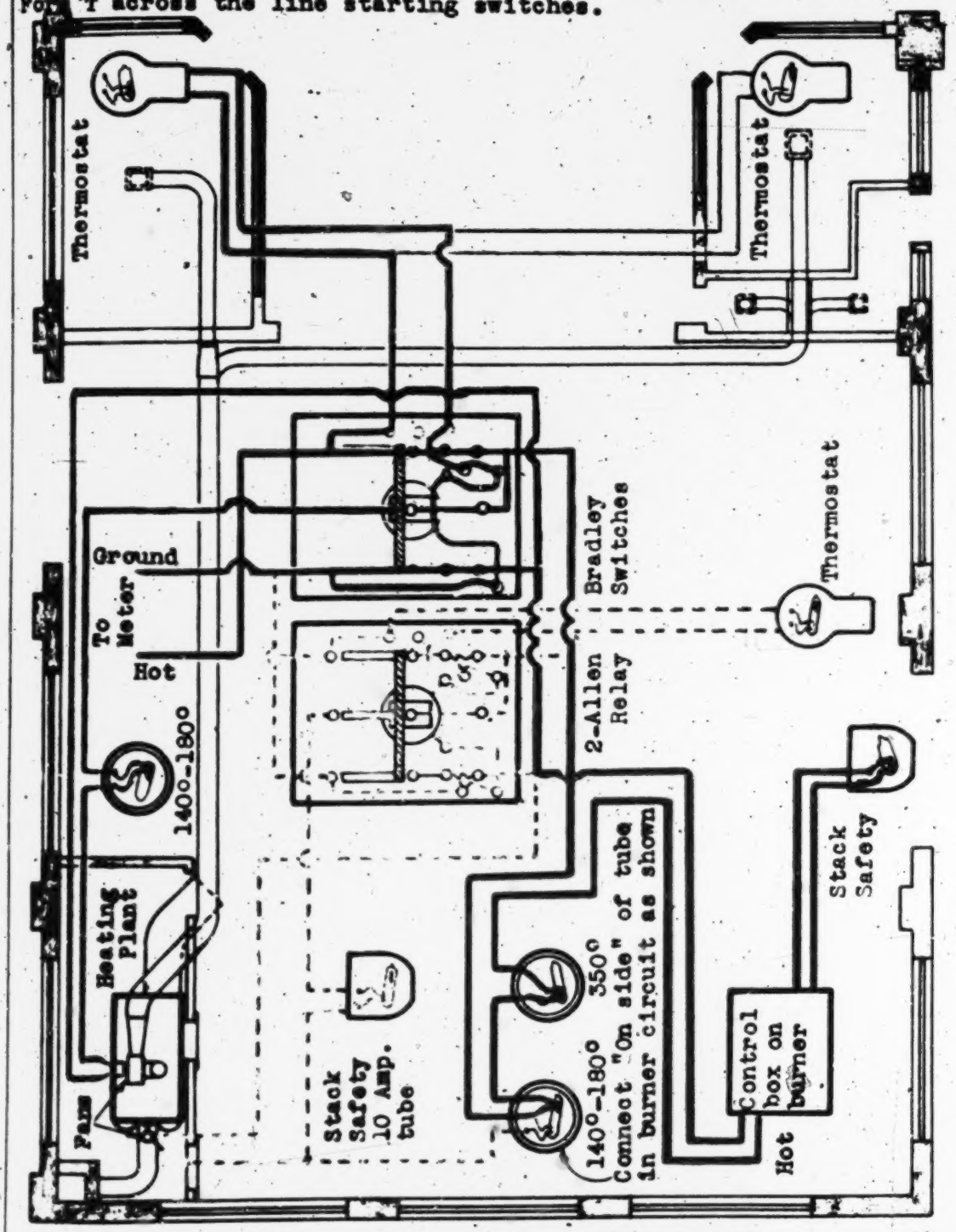
Fan type direct fired heating system showing wiring diagram with Oil-O-Matic Burner. Controls necessary for installation as shown consist of: Three standard Mercoid Thermostats. One Honeywell Stack Safety with ten amper tube. One Mercoid Hot Air Control range 140°to 180° F with ten amper tube and contact off in cold position. One Mercoid Hot Air Furnace Control range 140°to 180° F with three circuit tube. One standard Mercoid Furnace Temperature Control 350°. Two Allen-Bradley Type J-155 Form 2 across the line starting switches.



Drawn By M.V.
Approved By O.H.P.
O-Matic Corporation
Date May 5-27
A 198

MERCOID EXHIBIT F-1

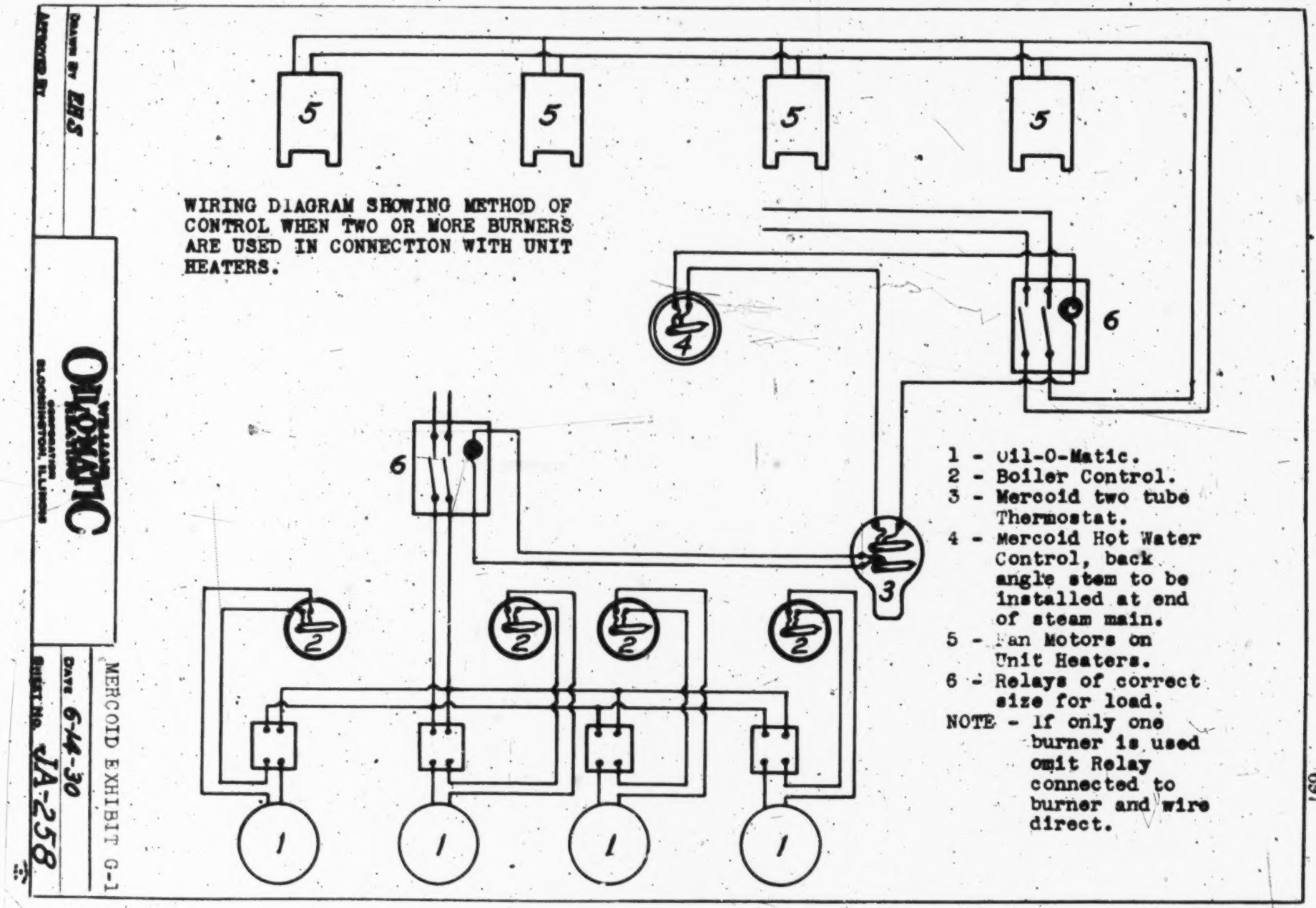
Fan type direct fired heating system showing wiring diagram with Oil-O-Matic Burner. Controls necessary for installation as shown consist of: Three standard Mercoid Thermostats. One Honeywell Stack Safety with ten amper tube. One Mercoid Hot Air Control range 140°to 180° F with ten amper tube and contact off in cold position. One Mercoid Hot Air Furnace Control range 140°to 180° F with three circuit tube. One standard Mercoid Furnace Temperature Control 350°. Two Allen-Bradley Type J-155 Form T across the line starting switches.



Drawn By N.V.G.	OIL-O-MATIC WILLIAMS HEATING CORPORATION BLOOMINGTON, ILLINOIS	Date May 5-27
Approved By O.H.P.		Sheet No. A 198

ES-10-4-5-27 PRINTED IN U. S. A.

MERCOID EXHIBIT F-3.



WIRING DIAGRAM SHOWING METHOD OF CONTROL WHEN TWO OR MORE BURNERS ARE USED IN CONNECTION WITH UNIT HEATERS.

1 - Oil-O-Matic.
2 - Boiler Control.
3 - Mercoid two tube Thermostat.
4 - Mercoid Hot Water Control, back angle stem to be installed at end of steam main.
5 - Fan Motors on Unit Heaters.
6 - Relays of correct size for load.

NOTE - If only one burner is used omit Relay connected to burner and wire direct.

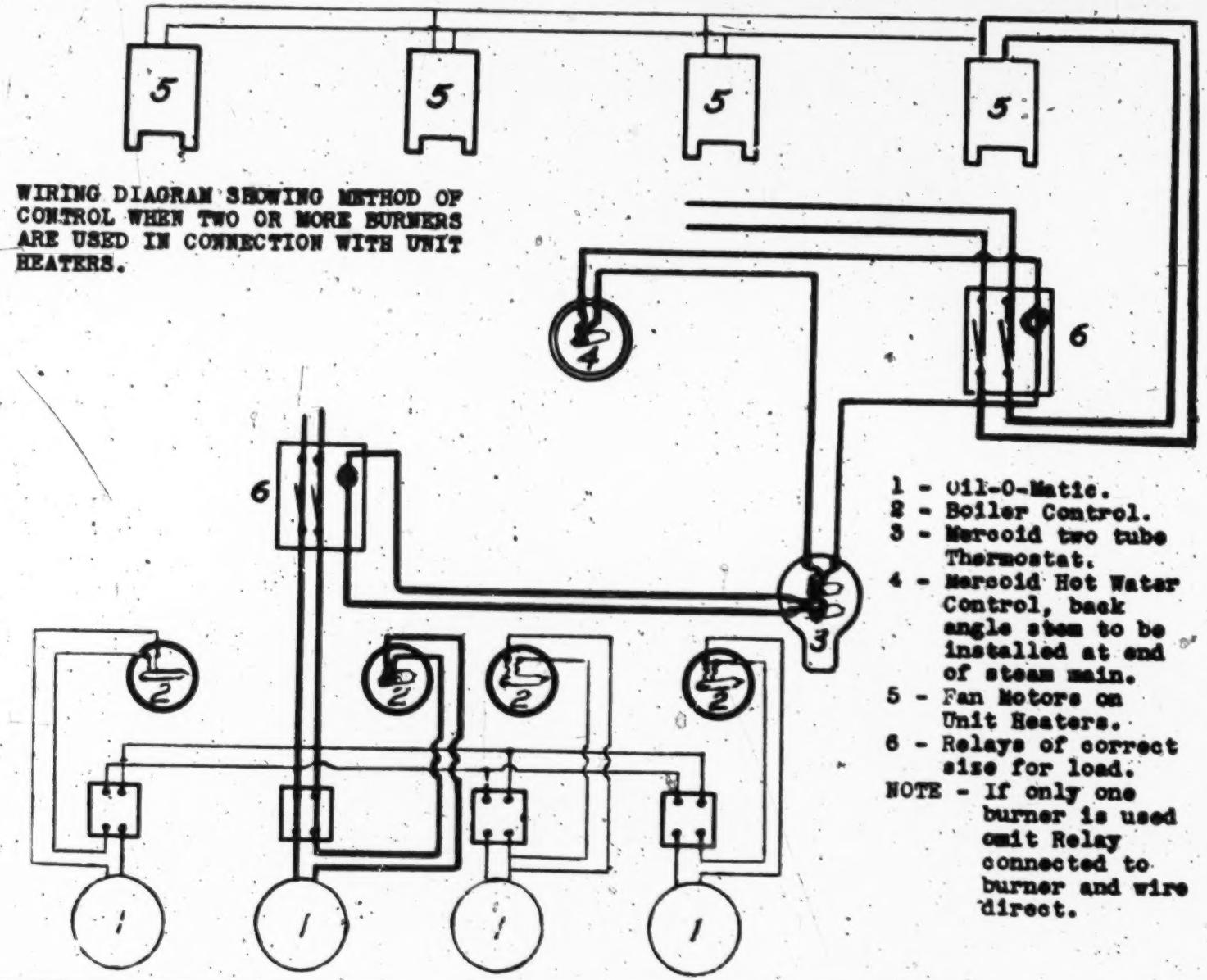
DRAWN BY EHS

Oil-O-Matic

DATE 6-14-30

DRAWING NO. JA-258

MERCOID EXHIBIT G-1



WIRING DIAGRAM SHOWING METHOD OF CONTROL WHEN TWO OR MORE BURNERS ARE USED IN CONNECTION WITH UNIT HEATERS.

1 - Oil-O-Matic.
2 - Boiler Control.
3 - Mercoid two tube Thermostat.
4 - Mercoid Hot Water Control, back angle stem to be installed at end of steam main.
5 - Fan Motors on Unit Heaters.
6 - Relays of correct size for load.

NOTE - If only one burner is used omit Relay connected to burner and wire direct.

Drawn by EHS

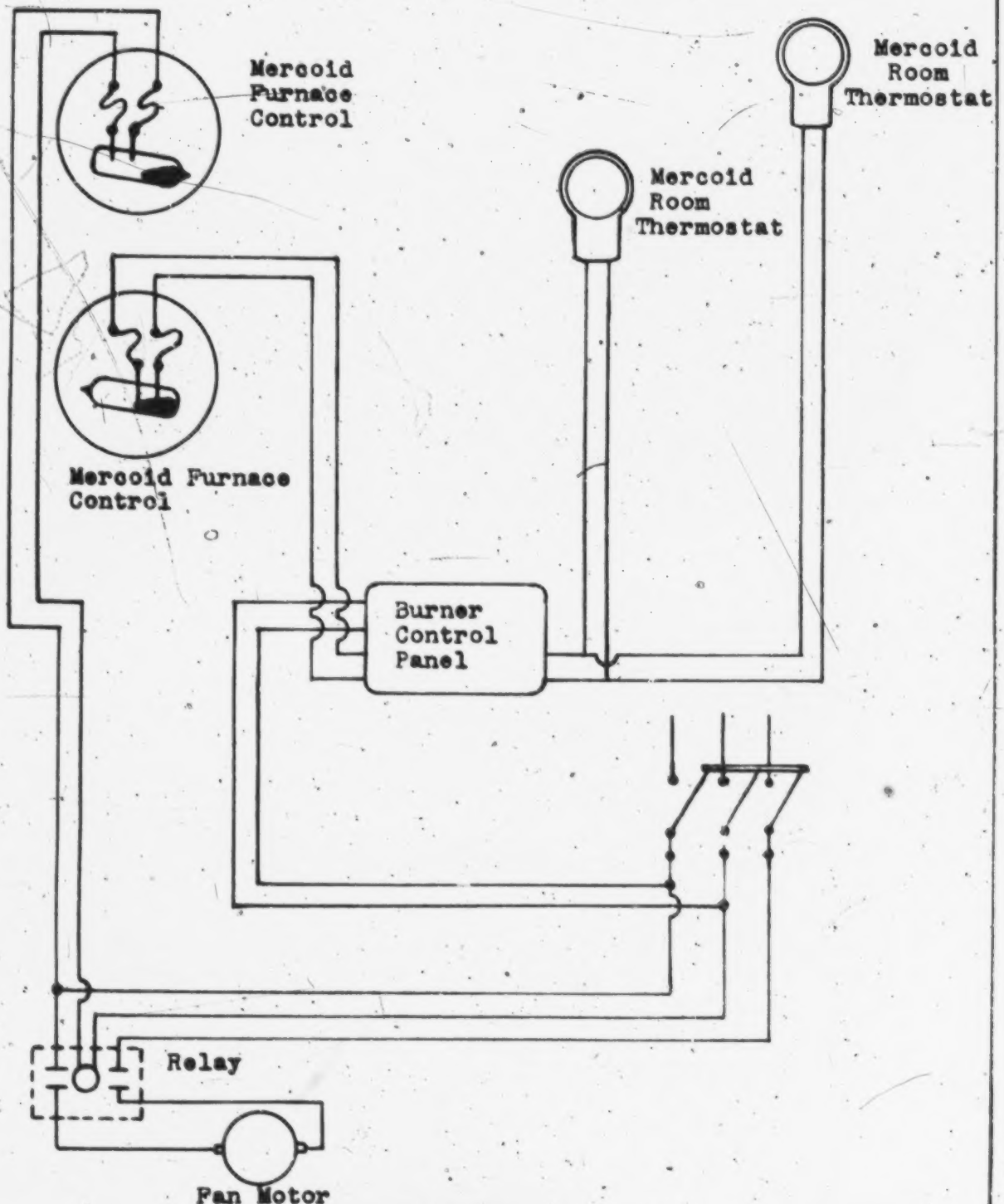
Oil-O-Matic

MERCOID EXHIBIT G-4

Date 6-14-30

Sheet No. MA-258

WIRING DIAGRAM OF INSTALLATION IN EVANGELICAL CHURCH, LEE AND FRONT STREET, BLOOMINGTON, ILLINOIS WHEN INSPECTED OCTOBER 2, 1940

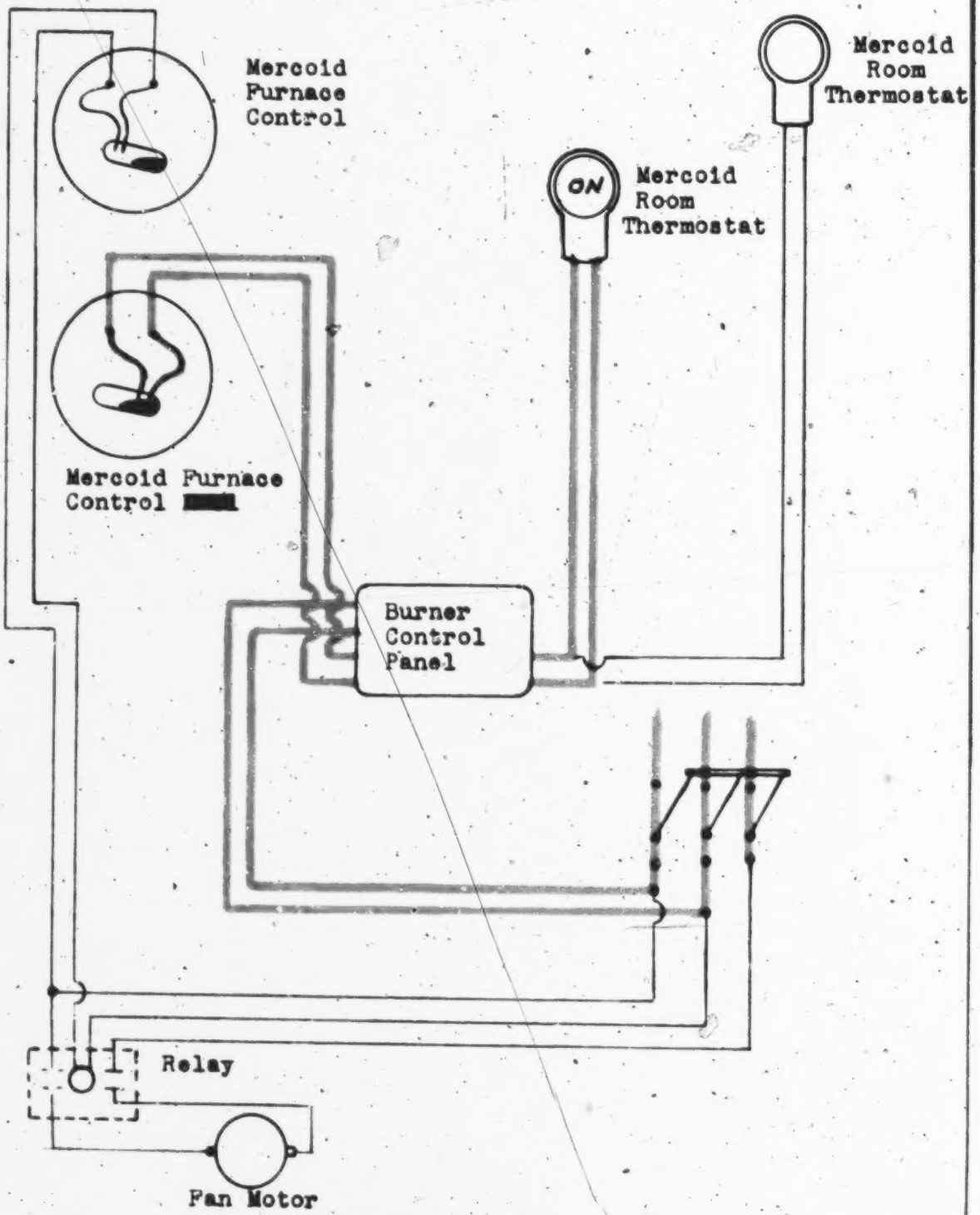


Drawn By H.V.G.
Approved By O.H.P.

WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

MERCOID EXHIBIT H-1
Date Oct. 2, 1940
Sheet No.

WIRING DIAGRAM OF INSTALLATION IN EVANGELICAL CHURCH, LEE AND FRONT STREET, BLOOMINGTON, ILLINOIS WHEN INSPECTED OCTOBER 2, 1940

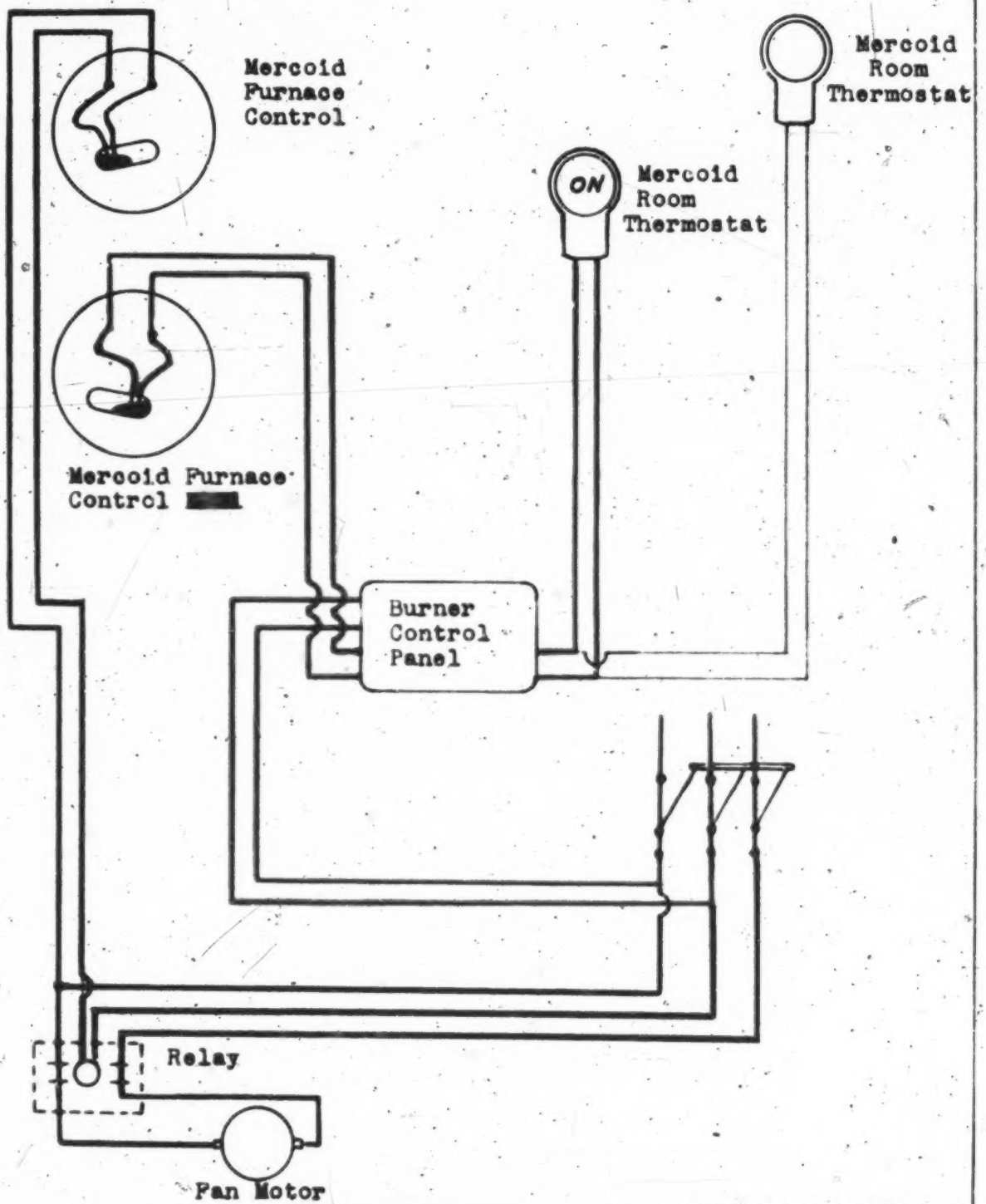


Drawn By H.V.G.
Approved By C.H.P.

WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

MERCOID EXHIBIT H-2
Date Oct. 2, 1940
Sheet No.

WIRING DIAGRAM OF INSTALLATION IN EVANGELICAL CHURCH, LEE AND FRONT STREET, BLOOMINGTON, ILLINOIS WHEN INSPECTED OCTOBER 2, 1940



MERCOID EXHIBIT H-3

Drawn By H.V.G.

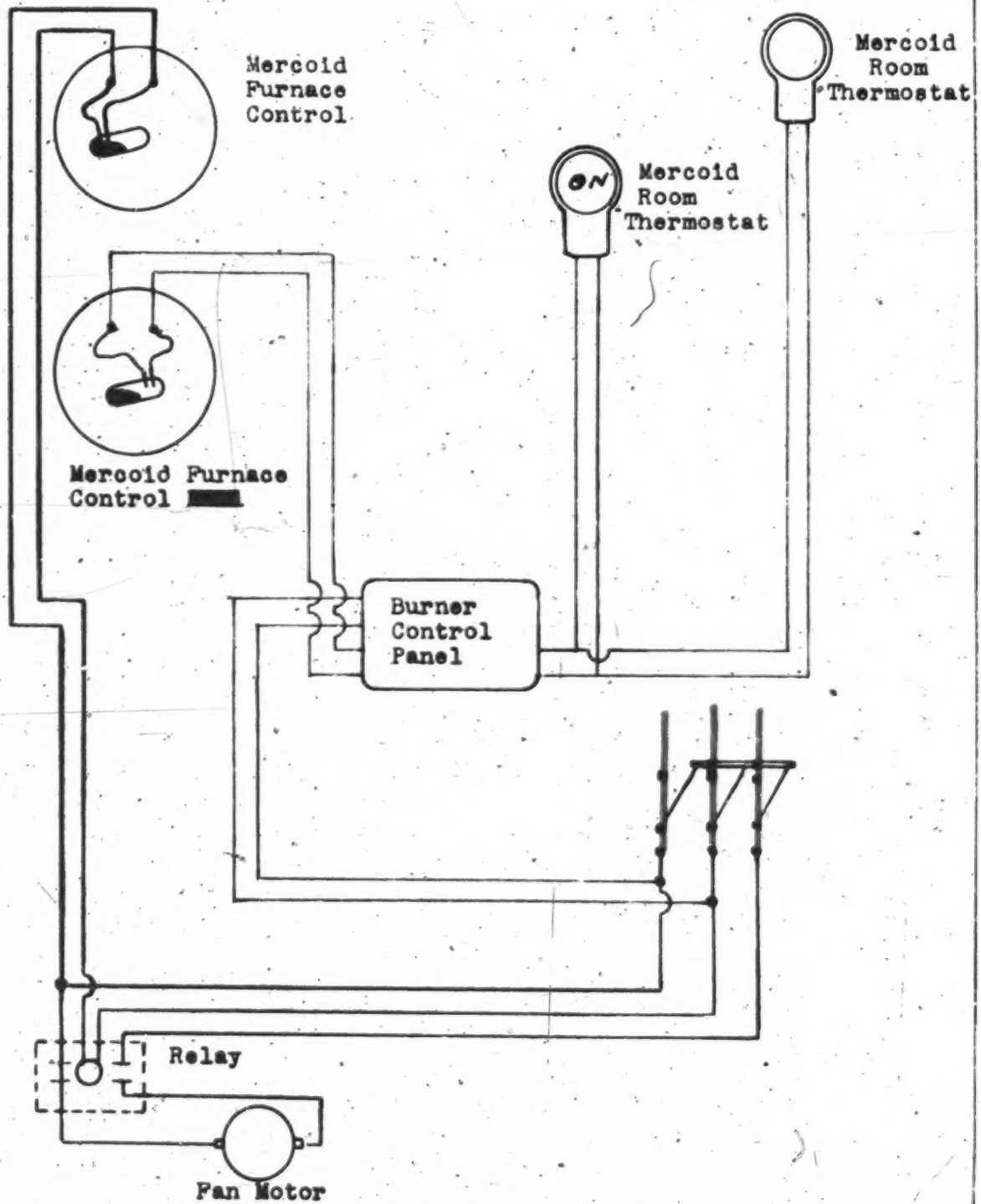
Approved By W.H.P.

WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

Date Oct. 2, 1940

Sheet No.

WIRING DIAGRAM OF INSTALLATION IN EVANGELICAL CHURCH, LEE AND FRONT STREET, BLOOMINGTON, ILLINOIS WHEN INSPECTED OCTOBER 2, 1940

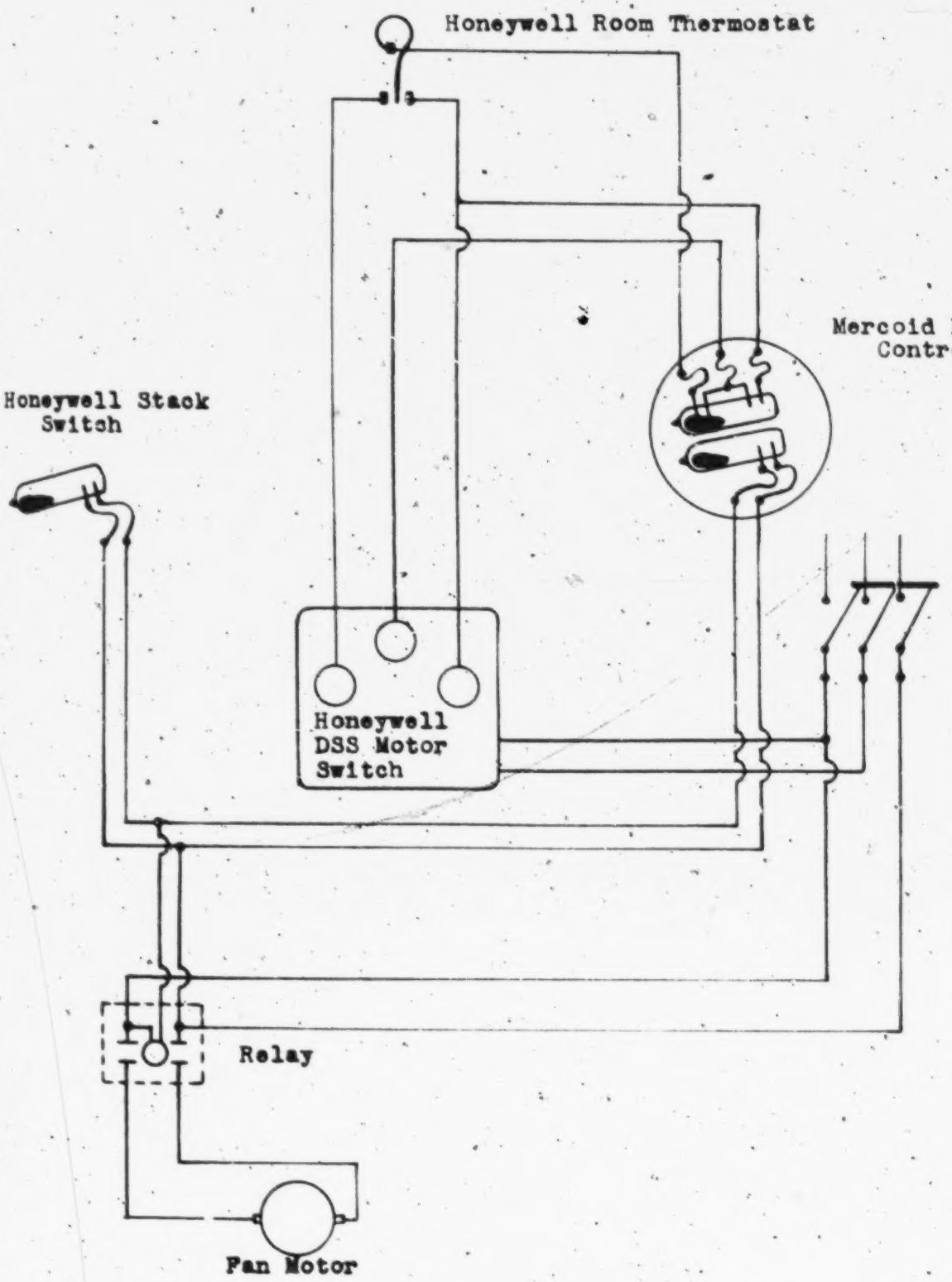


Drawn By H.V.G.
Approved By G.H.P.

WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

MERCOID EXHIBIT H-4
Date Oct. 2, 1940
Sheet No.

WIRING DIAGRAM OF INSTALLATION IN RESIDENCE OF NED E. DOLAN, 301 N. MERCER AVE., BLOOMINGTON, ILLINOIS WHEN INSPECTED ON OCTOBER 2, 1940.

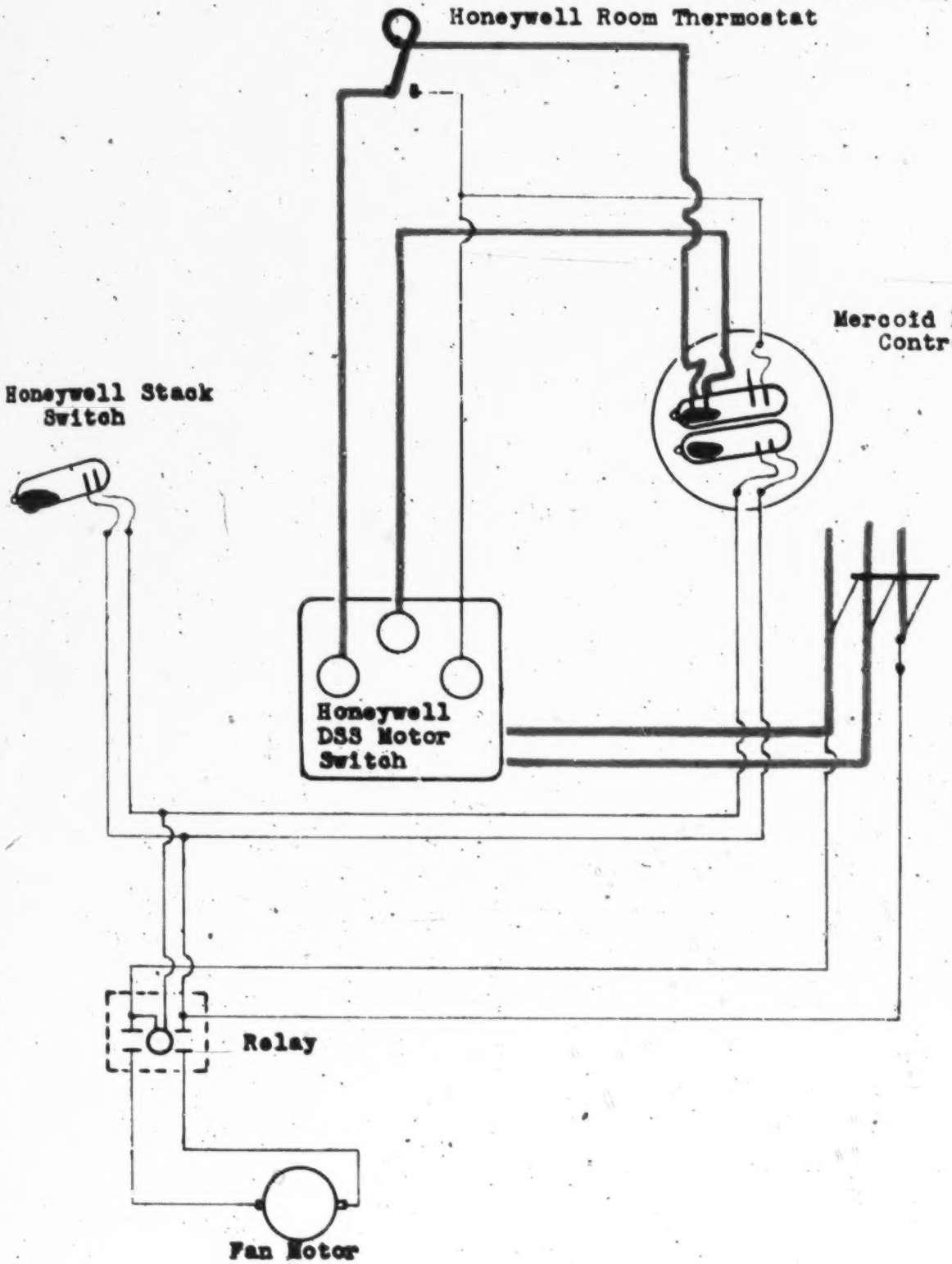


Drawn By N.V.G.
Approved By O.K.P.

WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

MERCOID EXHIBIT I-1
Date Oct. 2, 1940
Sheet No.

WIRING DIAGRAM OF INSTALLATION IN RESIDENCE OF MED E. DOLAN, 301 N. MERCER AVE., BLOOMINGTON, ILLINOIS WHEN INSPECTED ON OCTOBER 2, 1940.



Drawn By N.V.S.
Approved By O.K.P.

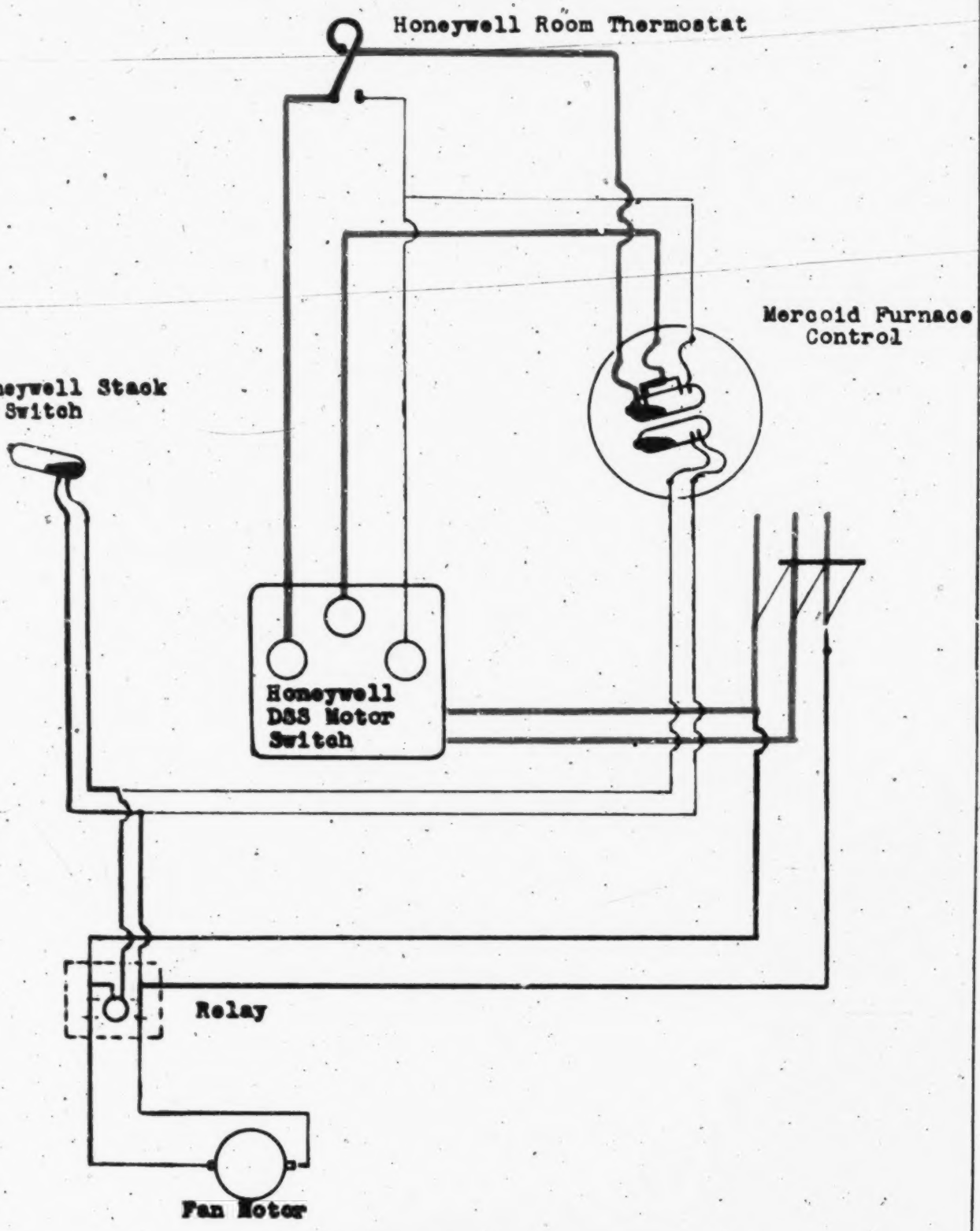
WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

MERCOID EXHIBIT I-2

Date Oct. 2, 1940

Sheet No.

WIRING DIAGRAM OF INSTALLATION IN RESIDENCE OF MED E. DOLAN, 301 N. MERCER AVE., BLOOMINGTON, ILLINOIS WHEN INSPECTED ON OCTOBER 2, 1940.



Drawn By N.V.S.
Approved By O.H.P.

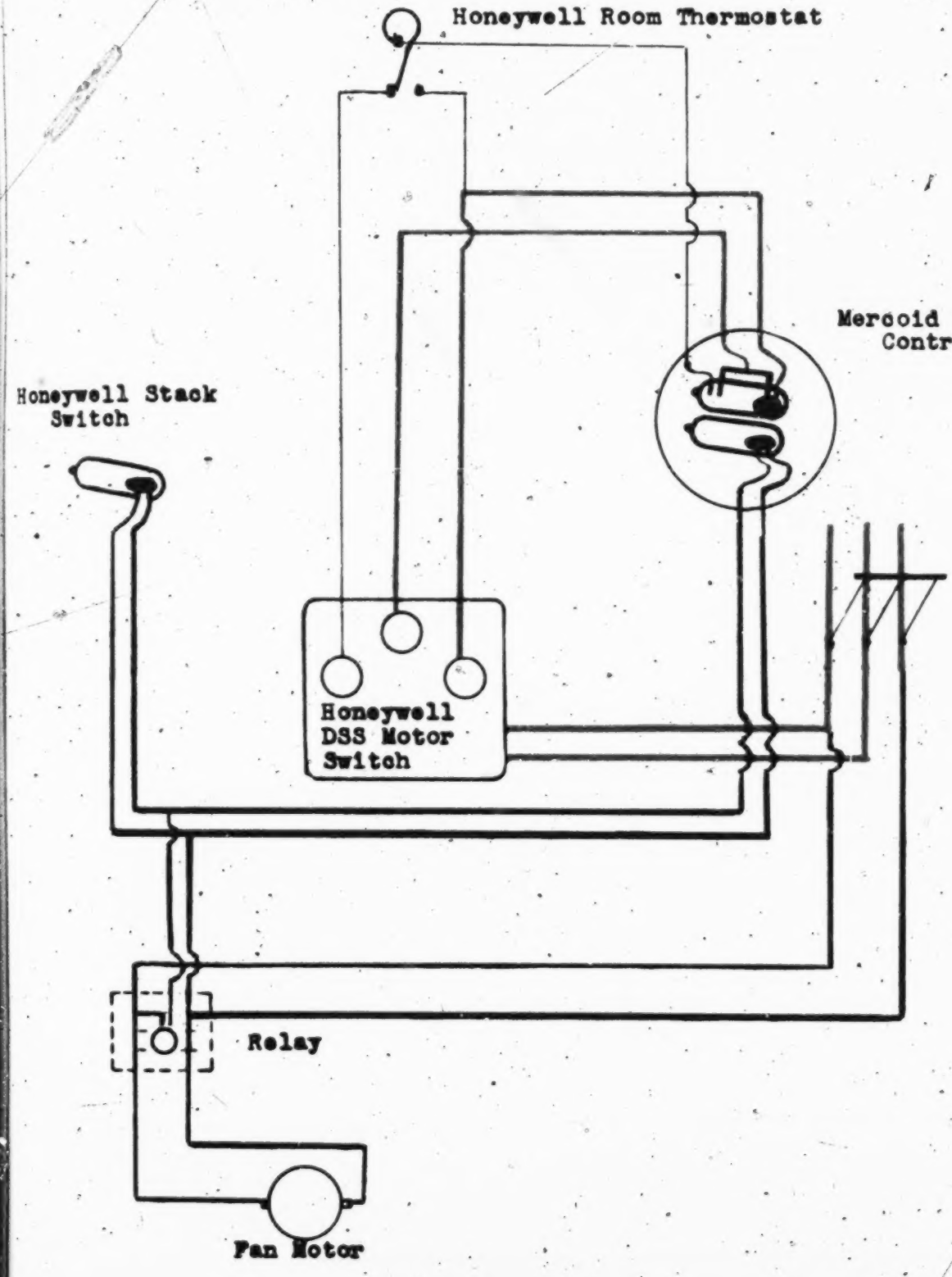
WILLIAMS OIL-O-MATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

MERCOID EXHIBIT I-3

Date Oct. 2. 1940

Sheet No.

WIRING DIAGRAM OF INSTALLATION IN RESIDENCE OF NED E. DOLAN, 301 N. MERCER AVE., BLOOMINGTON, ILLINOIS WHEN INSPECTED ON OCTOBER 2, 1940.



Drawn By N.V.S.
Approved By O.K.P.

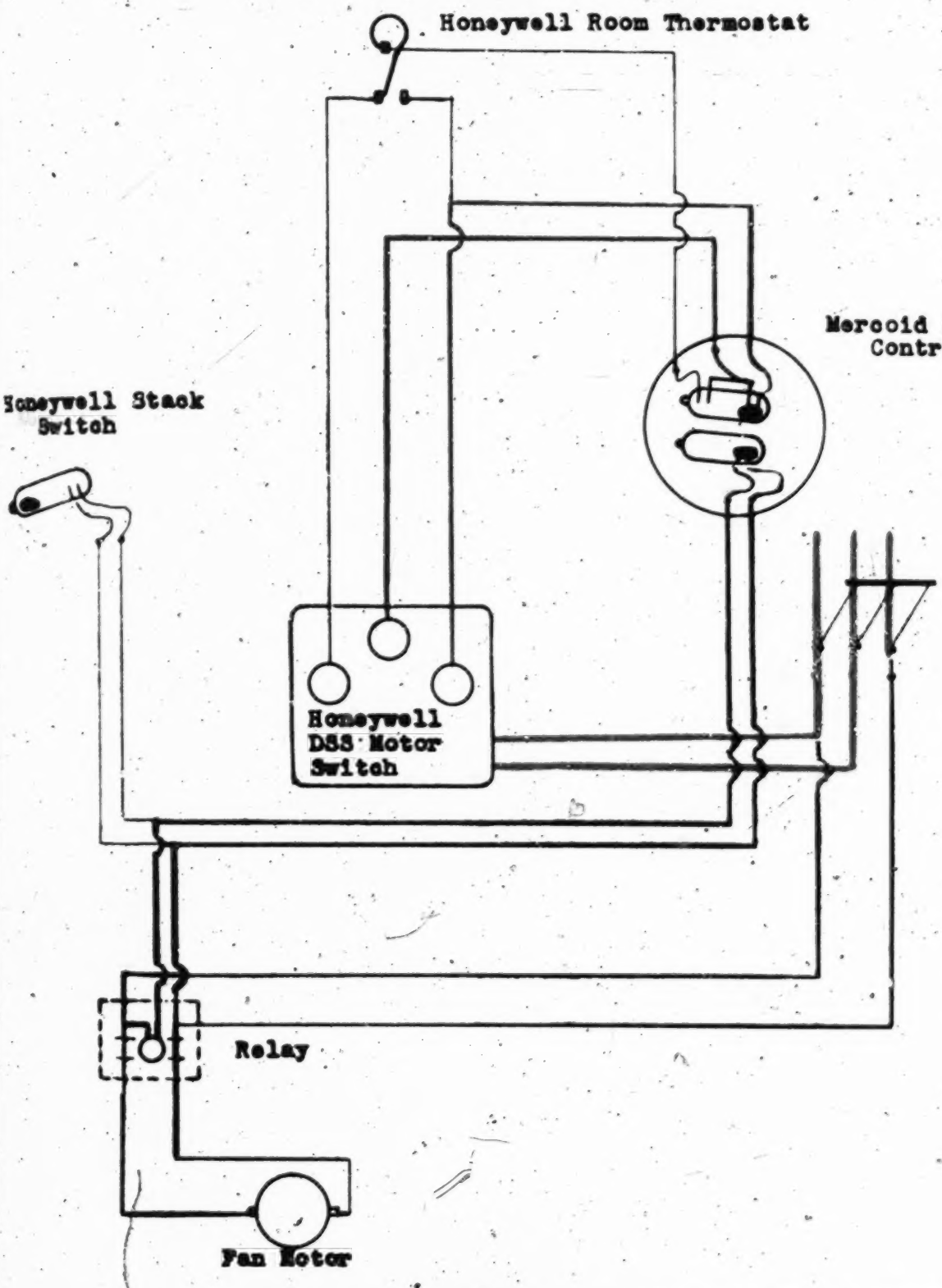
WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

MERCOID EXHIBIT I-4

Date Oct. 2, 1940

Sheet No.

WIRING DIAGRAM OF INSTALLATION IN RESIDENCE OF NED E. DOLAN, 301 N. MERCER AVE., BLOOMINGTON, ILLINOIS WHEN INSPECTED ON OCTOBER 2, 1940.

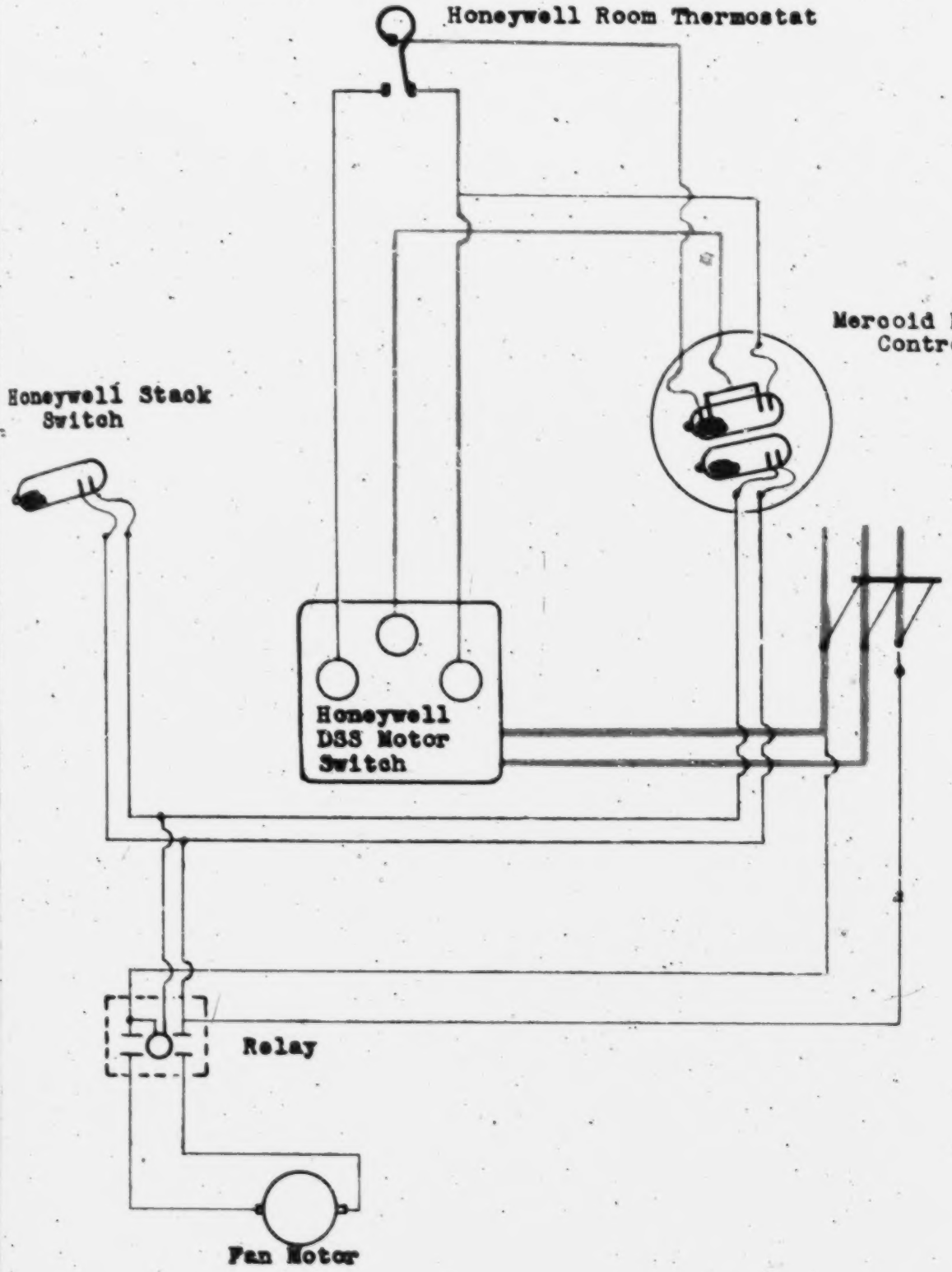


Drawn By N.V.S.
Approved By O.K.P.

WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

MERCOID EXHIBIT I-5
Date Oct. 2, 1940
Sheet No.

WIRING DIAGRAM OF INSTALLATION IN RESIDENCE OF
MED E. DOLAN, 301 N. MERCER AVE., BLOOMINGTON,
ILLINOIS WHEN INSPECTED ON OCTOBER 2, 1940.



Drawn By H.V.S.
Approved By O.K.P.

WILLIAMS OILOMATIC HEATING CORPORATION BLOOMINGTON, ILLINOIS

MERCOID EXHIBIT I-6
Date Oct. 2. 1940
Sheet No.

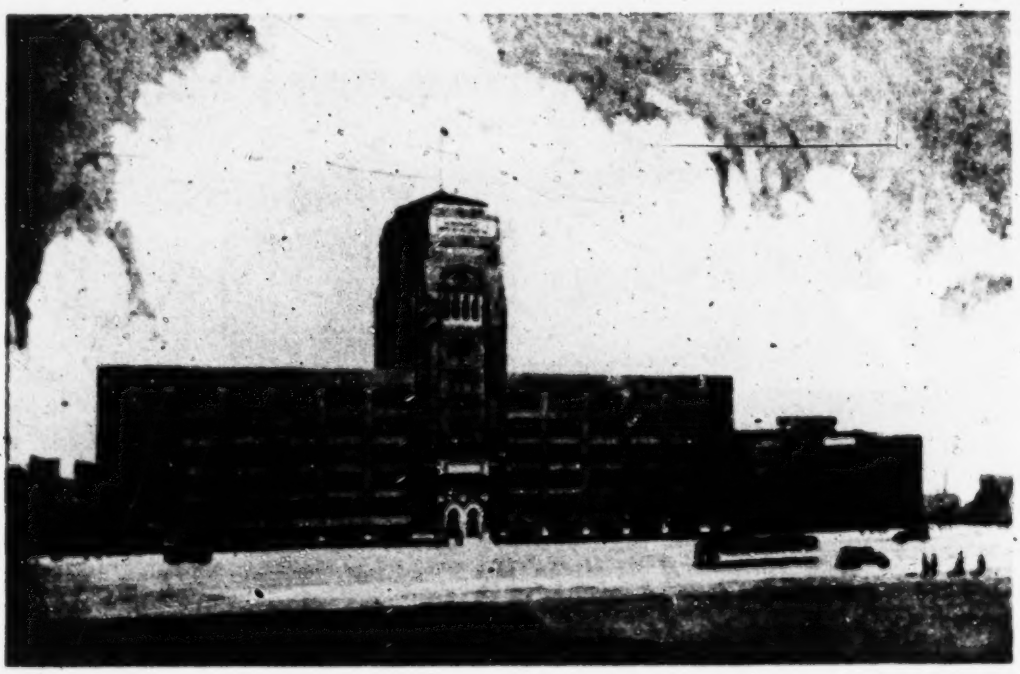
MINNEAPOLIS-HONEYWELL REGULATOR CO.

EXECUTIVE OFFICES

MINNEAPOLIS, MINN.

FACTORIES

MINNEAPOLIS, MINN. **WABASH, IND., U. S. A.**



View of Minneapolis, Minn., Plant

BRANCH OFFICES:

NEW YORK CITY	CHICAGO	PHILADELPHIA
MILWAUKEE	ST. PAUL	CLEVELAND
BOSTON	DETROIT	ST. LOUIS

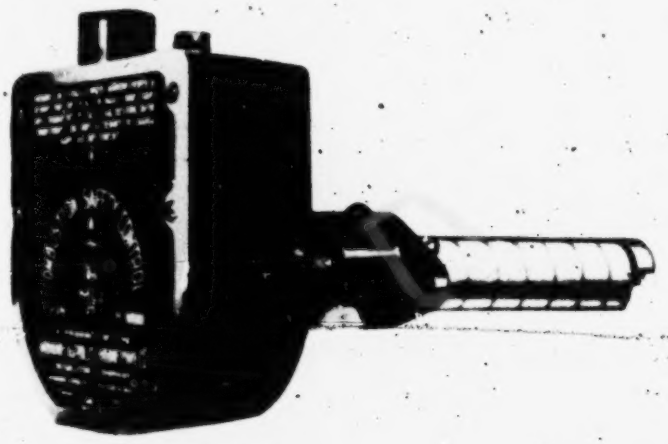
Mercoid Exhibit
J-1

MERCOID EXHIBIT J-1

TYPE B COMBUSTION SAFETY CONTROL

THE Combustion Safety Control is designed to be used with the Type DSS Motor Switch or Type DSSV Motor Switch Valve—and together they control the safe operation of the burner.

The actuating element is a coil of bi-metallic metal, which responds to the changes in temperature—approximately 100° change will cause it to function, and as the instrument is ordinarily installed in the stack this change is brought about in a very few seconds. In the head of the instrument on the end of the shaft to which the thermostatic element is attached are 2 mercury tube type switches. As the bi-metallic element expands or contracts, the high and low volt switches are tilted.



When the room Thermostat calls for heat and the Motor Switch enters the starting cycle, no heat passes up the stack if combustion fails to take place. Consequently, the Combustion Safety Control remains in the cold position, leaving the burner motor circuit open in the high voltage tube, so that at the completion of the Motor Switch's ignition cycle, the burner motor stops. This prevents an abnormal discharge of oil.

If the flame is extinguished in some manner before the burner motor has been shut off, the drop in stack temperature will cause the element of the Combustion Safety Control to contract and break the circuit to the burner motor. At the same time the circuit to the burner motor is broken, the circuit is established through the low voltage tube of the Combustion Safety Control to the Motor Switch, which will cause it to recycle and give the oil burner one more chance to function correctly. If combustion fails to take place, then the Combustion Safety Control will remain in the cold position and the burner will be locked up.

If current fails while the burner is on, the burner motor of course stops, and as the stack cools, the circuit to the Motor Switch is completed in the low voltage tube of the Combustion Safety Control, and is broken in the high voltage tube to the burner motor. When current service is resumed the burner motor will be off, but the Motor Switch will automatically recycle, again starting it.

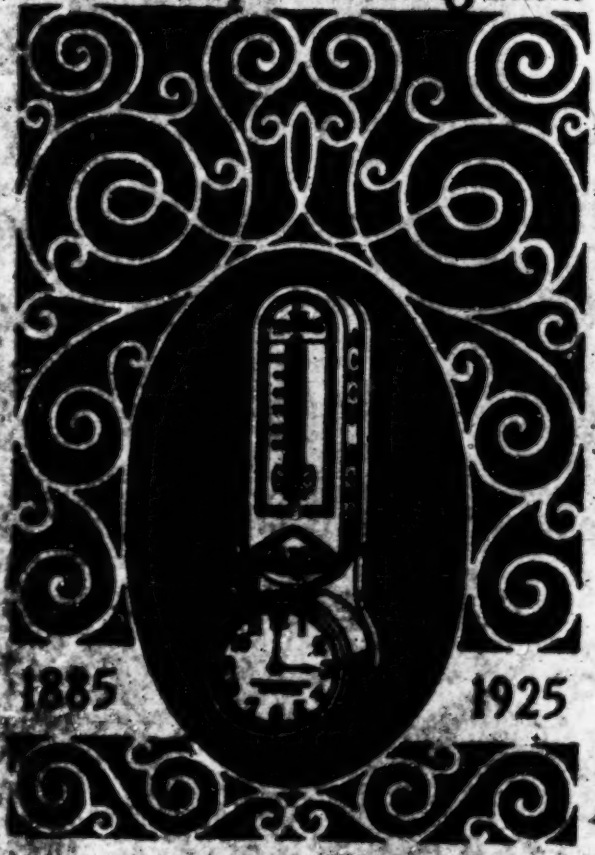
To meet Underwriters' requirements, the electrical circuit between the DSS Motor Switch and the Combustion Safety Control is so arranged that the System will not function when the Combustion Safety Control is disconnected.

Please Return to [illegible]

J-3

The "MINNEAPOLIS" HEAT REGULATOR

The Heart of the Heating Plant



Mercurial Exhibit J.3.

MINNEAPOLIS HEAT REGULATOR CO.

GENERAL OFFICE AND FACTORY
MINNEAPOLIS
MINNESOTA

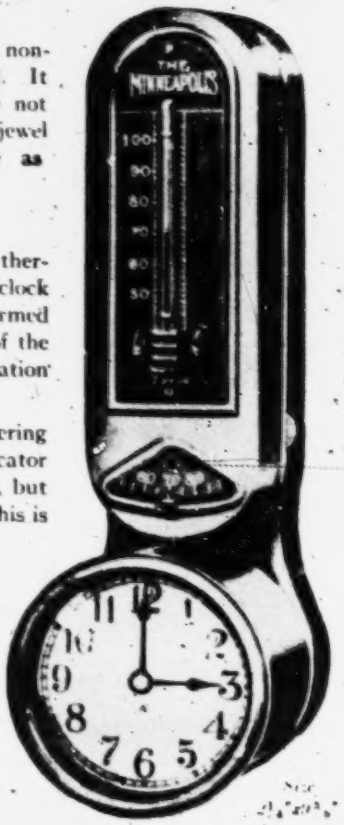
Established 1885



BRANCH OFFICES:

New York City	Chicago	Philadelphia	
Milwaukee	St. Paul	Cleveland	
Baltimore	Cincinnati	Kansas City	Pittsburgh
Boston	Denver	Omaha	Seattle
Buffalo	Detroit	Portland, Ore.	St. Louis
		Syracuse	

Model 55 Eight-Day Thermostat



THE Model 55 Thermostat is equipped with a plain non-jewel clock of the highest quality manufactured. It is reliable in its operation, although of course not possessing the time-keeping qualities of the jewel movement clock, nor will it continue to give as long and satisfactory service.

OPERATION

The mainspring of the clock is not required to move the thermostat indicator, as this produces an uneven strain on the clock spring, affecting its time-keeping qualities, this action is performed by the mechanism built into the thermostat. The function of the clock being simply to trip this mechanism similar to the operation of an alarm clock.

The range of the automatic throw of the indicator, both lowering at night and raising in the morning, is adjustable. The indicator can not only be lowered to any desired degree of temperature, but it can also be raised to any desired degree of temperature. This is possible only with "MINNEAPOLIS" eight-day thermostats.

The adjustment of the point to which the indicator lowers at night and raises in the morning, is made by the adjustable discs on the side of the thermostat, and this adjustment can be altered at will.

The thermostat temperature indicator can be moved at any time without in any way affecting the automatic action of the thermostat, and without disengaging the clock control.

The Model 55 Thermostat is finished in sand blast bronze.



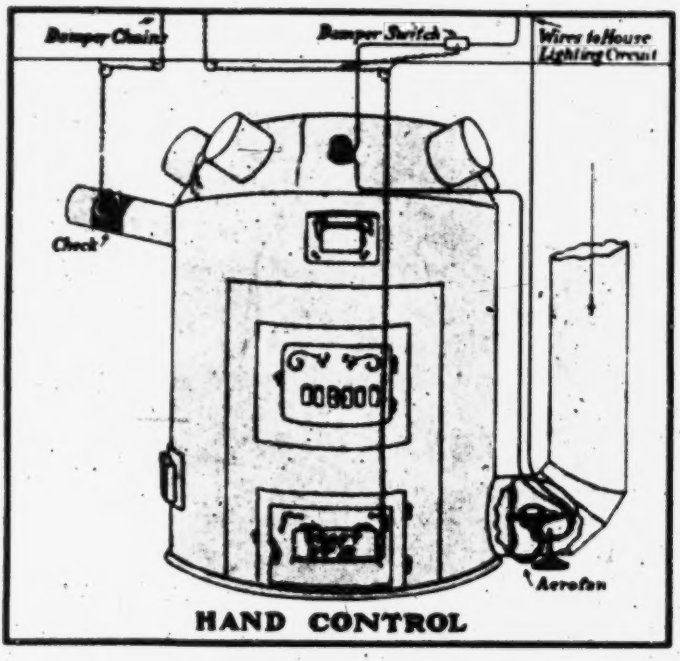
View of Thermostat Assembling Department

Heating Specialties

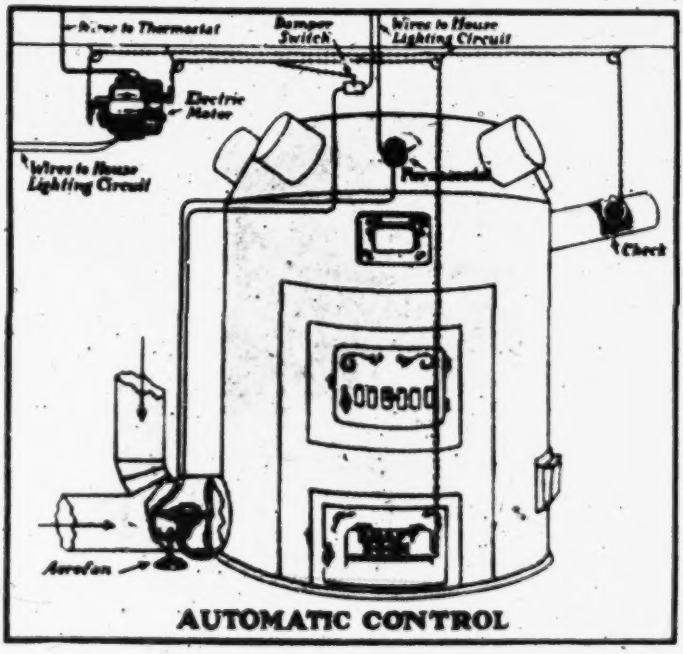
Mercoid Exhibit
J-4

HONEYWELL
Heating Specialties Company
Wabash, Indiana

Aerofan Installation



HAND CONTROL



AUTOMATIC CONTROL

AGREEMENT

Reel K179 Page 323

AGREEMENT entered into this _____ day of March, 1939, by and between MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, a corporation organized and existing under the laws of the State of Delaware and having its principal place of business at Minneapolis, Minnesota, and COOK ELECTRIC COMPANY, a corporation organized and existing under the laws of the State of Illinois and having its principal place of business at Chicago, Illinois.

W I T N E S S E T H:

WHEREAS, Minneapolis-Honeywell Regulator Company is the owner of the following United States Letters Patent:

Numbers	Patentees	Dated
1,951,663	John P. Kriechbaum	March 20, 1934
1,989,278	David J. Jones	January 29, 1935

and a pending application of John P. Kriechbaum for Letters Patent, Serial No. 678,429, filed June 30, 1933, for improvements in Control Systems;

WHEREAS, Cook Electric Company is the owner of a pending application of John S. Baker for Letters Patent, Serial No. 735,457, for improvements in Automatic Control System for Warm Air Furnaces, filed July 16, 1934, as a continuation of application, Serial No. 645,555, filed December 3, 1932;

WHEREAS, Interference No. 73,148 was declared by the Commissioner of Patents on August 24, 1936, involving said Kriechbaum application, Serial No. 678,429, and said Baker

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application, Serial No. 735,457; and

WHEREAS, it is the desire of the parties to settle said interference and to exchange licenses under the foregoing patents and applications.

NOW, THEREFORE, in consideration of the sum of One Dollar ($1.00) in hand paid, each to the other, and other good and valuable considerations, the receipt of which is hereby acknowledged, the parties hereto agree, each for itself, to perform and observe the covenants, terms and conditions hereof by it to be performed or observed.

1. Said Minneapolis-Honeywell Regulator Company hereby gives and grants unto said Cook Electric Company a non-exclusive, royalty-free license to manufacture, use, sell and install heating systems and apparatus embodying the invention, inventions and/or improvements set forth, disclosed and claimed or intended to be claimed and covered by claims 5 to 8, inclusive, and claims 21 to 25, inclusive, of said United States Letters Patent No. 1,951,863, granted to John P. Kriechbaum on March 20, 1934, for and during the life of said patent, and any and all other claims thereof as might be infringed by said Cook Electric Company in exercising its right hereunder to manufacture, use, sell and install such heating systems and apparatus embodying the subject matter covered by said claims 5 to 8, inclusive, and claims 21 to 25, inclusive.

2. Said Minneapolis-Honeywell Regulator Company hereby also gives and grants unto said Cook Electric Company a non-exclusive, royalty-free license to manufacture, use, sell and install heating systems and apparatus embodying the invention.

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inventions and/or improvements set forth, disclosed and claimed or intended to be claimed and covered by claims 4, 9 and 11 of said United States Letters Patent No. 1,989,278, granted to David J. Jones on January 25, 1935, for and during the life of said patent, and any and all other claims thereof as might be infringed by said Cook Electric Company in exercising its right hereunder to manufacture, use, sell and install such heating systems and apparatus embodying the subject matter covered by said claims 4, 9 and 11.

3. Said Minneapolis-Honeywell Regulator Company hereby consents to and agrees to deliver to said Cook Electric Company, upon the execution of this agreement, a concession of priority of invention, unto John S. Baker, of the subject matter of the counts forming the issue of said interference No. 71,148 and all common subject matter disclosed in both said applications, to-wit: Serial Nos. 678,429 and 645,555.

4. Said Cook Electric Company hereby gives and grants unto said Minneapolis-Honeywell Regulator Company a non-exclusive, royalty-free license to manufacture, use, sell and install heating systems and apparatus embodying the subject matter covered by or intended to be covered by the counts forming the issue of said interference and all common subject matter disclosed in both said applications and any and all other claims of said Baker application or patent that will issue thereon as might be infringed by said Minneapolis-Honeywell Regulator Company in exercising its rights hereunder to manufacture, use, sell and install heating systems and apparatus embodying the subject matter covered by said counts forming said interference issue and common to both said applications; and said Minneapolis-Honeywell Regulator Company hereby

LIBER K179 PAGE 326

gives and grants unto said Cook Electric Company a non-exclusive, royalty-free license under any and all claims in said Kniechbaum application or patent that will issue thereon as might be infringed by said Cook Electric Company in the manufacture, use, sale and installation of heating systems and apparatus embodying the subject matter disclosed in said Baker application or patent that will issue thereon.

5. Each of the parties agrees that it will pay the final government fee in its application involved in said interference No. 73,148, and will issue the patent thereon.

6. The licenses herein granted to each of the parties by the other shall only be assignable by the licensee in connection with the sale of its entire business relating to the temperature control field, and shall not give any right to the licensee, either expressly or by implication, to grant sub-licenses thereunder.

7. The acceptance of a license this day by Cook Electric Company from Minneapolis-Honeywell Regulator Company under a Freeman Patent No. 1,813,732, does not impliedly give any right to the latter company to grant sub-licenses to its other licensees under said Freeman Patent on two-speed operation as covered by said Baker application or any other application or patent owned or controlled by Cook Electric Company.

8. Each party hereto acknowledges the validity of the other party's patents, or patents to issue, under which cross licenses are granted herein by the present instrument, and will not deny or contest their validity or aid others in so doing, the application of this paragraph being limited to those claims of the herein-referred-to patents and patents to issue under which each of the parties has granted licenses to the other.

5-9-39 Affirmed Chas. Eb—ld

RECORDED K179 PAGE 327

9. Said Minneapolis-Honeywell Regulator Company hereby waives any and all claims it may have against Cook Electric Company for past infringement of said Kriechbaum Patent No. 1,951,663 and said Jones Patent No. 1,989,278.

IN WITNESS WHEREOF, the parties hereto have duly caused this instrument to be executed by their proper officers thereunto duly authorized on the day and year first above written.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

By _____

Attest:

_____
Secretary

COOK ELECTRIC COMPANY

By _____

Attest:

_____

RECORDED U.S. PATENT OFFICE
Commissioner of Patents
RECORDED K179 PAGE 323

MERCOID EXHIBIT O.

1315 WILLARD L. HUFF, called as a witness on behalf of the plaintiff, having been first duly sworn, testified as follows:

Direct Examination by Mr. Moore.

Q. 1. Will you please state your name, age, residence and occupation?

A. Willard L. Huff; 52; Minneapolis, Minnesota; manufacturer.

Q. 2. Are you an officer of the Minneapolis-Honeywell Regulator Company?

A. I am.

Q. 3. What office do you hold?

A. Vice president and treasurer.

Q. 4. How long have you been vice president?

A. Since the organization of the company, in October, 1927.

Q. 5. And how long have you been treasurer?

A. I have held those two offices—I was originally treasurer and subsequently made vice president and treasurer, I think, in 1929.

Q. 6. Who was the predecessor of the Minneapolis-
1316 Honeywell Regulator Company?

A. The Minneapolis Heat Regulator Company of Minneapolis, Minnesota, and the Honeywell Heating Specialties Company of Wabash, Indiana.

Q. 7. Did you hold an office in either of the predecessors.

A. Yes. I was secretary and treasurer of the Honeywell Company.

Q. 8. As vice president of the Minneapolis-Honeywell Company, are you authorized by the board of directors under the by-laws of the corporation to execute contracts or licenses in the name of the corporation?

A. I am.

Q. 9. Are there any other officers who are also authorized to do the same?

A. Several, yes.

Q. 10. Can you name them?

A. Mr. H. W. Sweatt, president; and Mr. C. B. Sweatt, vice president; Mr. Charles C. Buckland, secretary; Mr. M. C. Honeywell, chairman of the board; and Mr. Richard P. Brown, vice president.

Q. 11. Would each one of these officers be advised as to any contracts or licenses which have been executed by any of the other officers?

1317 A. Well, with certain exceptions, because of their absence from Minneapolis, both Mr. Brown and Mr. Honeywell might not be advised.

Q. 12. But the president, Mr. Harold Sweatt, and you and Mr. Charles B. Sweatt would know of any licenses granted under any of the patents owned by Minneapolis-Honeywell, would you not?

A. In all probability, yes.

Q. 13. Now, Minneapolis-Honeywell has introduced or furnished Mercoid copies of licenses under the Freeman patent granted to the Cook Electric Company, the Penn Electric Switch Company, Perfex Corporation, Bendix Aviation Corporation, and White-Rodgers Company. You are familiar with those licenses, are you not?

A. I am.

Q. 14. I believe you executed the last three for the corporation.

Mr. Freeman: Do not the copies show who executed them, Mr. Moore?

Mr. Moore: Yes, they do, but I just want to show he was personally familiar.

Mr. Freeman: If they have his name on, we will concede they were signed by Mr. Huff, and we furnished them to you.

1318 Mr. Moore: Yes.

A. Of course these were signed by typewriter and I assume that I did sign them.

Q. 15. And there was a price schedule furnished also relating to these contracts or licenses, and I believe that accompanied each one of the licenses, did it not?

A. Yes.

Q. 16. Your letter of May 7, 1940, has been set up by the Mercoid in the pleadings, and I notice that it is addressed to Mr. C. J. Swan, Detroit Lubricator Company, and Mr. Ira McCabe of the Mercoid Corporation. Was

Minneapolis-Honeywell negotiating the granting of a license to the Detroit Lubricator Company at that time?

A. Yes.

Q. 17. Do you know whether or not a license was ever executed?

A. It was not executed by Detroit Lubricator Company.

Q. 18. Do you know if any other agreement than a typed or printed license was made with the Detroit Lubricator in relation to the Freeman patent or for the sale of the combination furnace control, such as defined in the printed form of this license?

A. Will you read the first part of that question, please?

1319 Mr. Moore: Will you read it?

(Q. 18 was thereupon read.)

A. The answer is that they took no license.

Q. 19. As treasurer of the Minneapolis-Honeywell, did Minneapolis ever receive from Detroit Lubricator any money or other consideration for or involving the sale of combination furnace controls such as defined in the license?

A. No.

Q. 20. And sold by Detroit Lubricator?

A. The answer is no.

Q. 21. Now, in this price schedule A, which was attached to and forming a part of the licenses heretofore referred to, the manufacturer's price, the net minimum price for a combination furnace control shall be $5.25. Is that correct?

A. That is correct.

Q. 22. I show you here a Detroit Lubricator Company manufacturer's price sheet, effective January 20, 1941, and ask you if that does not set forth the same price as your furnace limit and blower controls, that is, a combination blower and limit control.

Mr. Freeman: That is objected to as immaterial. There is no showing at all that Minneapolis had anything to
1320 do with the Detroit Lubricator Company; that as to the price list of Detroit Lubricator Company, it is the best evidence.

Q. 23. You may answer.

A. My answer would be that I am not familiar at all with the Detroit Lubricator Company's price list. Their

number applied to this particular item, which you describe, is not familiar to me and I am not certain whether their defined combination blower and limit is comparable to what we call our combination furnace and fan control.

Q. 24. What is the price set opposite?

A. $5.25.

Q. 25. Which is the same as the price set up in the price schedule A; is it not?

A. Yes.

Mr. Moore: A photostat of Detroit Lubricator Company, manufacturer's price sheet, effective January 20, 1941, is offered in evidence as MERCOID EXHIBIT K.

Mr. Freeman: That is objected to as not properly proven, and for the further reason that it is immaterial.

(The document was so marked.)

Q. 26. Referring to the licenses I showed you at first to Cook Electric and the others, have any of these
1321 licenses, to your knowledge, been modified or amplified since the date of execution by letters or other communications in writing?

A. It is my recollection that the original licenses were slightly altered at the time the license was granted to the St. Louis Company, White-Rodgers Electric Company.

Q. 27. Was that the only license that was altered?

A. No; I say the first licenses granted, as I recall it, were slightly altered at the time a license was issued to White-Rodgers Electric Company.

Q. 28. And that was about the first of April, 1940?

A. I do not recall the date, but that is approximately right.

Q. 29. You have submitted a copy of this same license to The Mercoid Corporation, have you not?

A. I think it was an identical copy, yes.

Q. 30. And have you submitted the same license to other control manufacturers?

A. You mean in addition to those who have taken the license?

Q. 31. Yes.

A. A copy was submitted to Mr. Swan.

Q. 32. Of Detroit Lubricator Company?

A. Of the Detroit Lubricator.

1322 Q. 33. Now, calling attention to your letter of May 7, 1940, addressed to Mr. Swan and Mr. McCabe, there

were two carbons attached to that letter, and you state in this letter:

"In connection with the printed form of licensing agreement which I handed to you in Chicago last week, I should at the same time have furnished you with copies of the attached letters, both of which have become a part of this agreement, in the cases where licenses have been granted and these same conditions would apply in connection with any new licenses issued."

I call your attention to that letter and also to the carbons attached to it. Now, are those the changes that were submitted to the White-Rodgers Company that you have just referred to?

A. They were, except I want to call your attention to a typographical error which appears in the second carbon copy of the letter, where a reference is made to 25 per cent, which should have read 25 cents.

Q. 34. I call your attention to your letter of October 7, 1940, addressed to Mr. Ira E. McCabe, which has been set up in the pleadings by Mercoid, and ask you if that is not a notice of that error that you spoke of?

1323 A. That is correct.

Q. 35. Now, these two carbons attached to your letter of May 7th, which you say were submitted to White-Rodgers, calling attention to an error in the second one, were they dictated by Mr. Harold W. Sweatt, the president of the company?

A. I cannot be sure, but it would appear from this carbon copy that that was the case.

Q. 36. His initials appear in the lower left hand corner?

A. That is true.

Q. 37. And the same in the second one?

A. That is right.

Q. 38. Now, were these same changes submitted to the other licensees who had already obtained licenses at that time?

A. I do not know at what time they were submitted to the other licensees, but they were submitted.

Q. 39. So all of the present licensees that I have referred to here did receive this change or amendment to the license?

A. I think that is true.

Q. 40. In your letter of October 7th you stated:

"It has just been called to my attention that with
1324 my letter of May 7, 1940, addressed to you,"

and you refer to that typographical error.

A. The answer is yes.

Q. 41. Who called that to your attention?

A. I do not recall.

Q. 42. It was called to your attention apparently just before you wrote this letter, was it not?

A. Apparently so.

Q. 43. Yes.

A. I am not sure.

Q. 44. Do you happen to know when this controversy between Minneapolis-Honeywell and Mercoid Corporation first arose by filing of the suit; do you remember the date?

A. It was my impression it was some time during 1940.

Q. 45. Yes. The record shows that The Mercoid Corporation vs. Minneapolis was filed on June 29, 1940.

Mr. Freeman: That really is the best evidence, is it not, Mr. Moore?

Mr. Moore: Yes.

Q. 46. So this typographical error then occurred from the time that you submitted the letter to the Mercoid on May 7, 1940, until just prior to October 7, 1940?

Mr. Freeman: The record so shows.

1325 A. (No answer.)

Q. 47. These two amendments to your license agreement attached to your letter of October 7th are carbon copies. Do you know whether the original of these carbon copies was actually mailed to any of the licensees that you have referred to?

A. Well—

Mr. Freeman: Do you mean with the typographical error, Mr. Moore?

Mr. Moore: No, I did not say anything about the typographical error.

Mr. Freeman: The carbon copies include the typographical error.

Mr. Moore: And I asked him if the original were sent out to any of the licensees.

A. As I recall it, the originals which were a part of the first licenses granted did not carry that error; that the typographical error occurred at the time I submitted these two supplemental letters to Mercoid Corporation and to Detroit Lubricator Company.

Q. 48. When you were with the Honeywell Heating Specialties Company, the Honeywell Heating Specialties Company also sold warm air furnace controls, did they not?

A. That is true.

1326 Q. 49. And also sold fan controls?

A. I imagine we did. I cannot be certain.

Q. 50. Did the Honeywell Specialties Company sell as a unit a room thermostat, a furnace fan control and a warm air furnace limit control?

A. I cannot be certain of the one element. I am sure we sold thermostats as units, and I am sure we sold limit controls as such, but I cannot be sure at that time that we manufactured a fan switch.

Q. 51. Your catalog of 1925 and 1926 would show whether or not you manufactured a fan control?

A. It should.

Mr. Freeman: What is the name of that catalog, Mr. Moore, so we might look it up too?

Mr. Moore: I will give you a copy of it.

Mr. Freeman: All right.

Mr. Moore: It is in the other depositions, the Bloomington depositions. The Honeywell Heating Specialties Company of Wabash, Indiana, 1925-1926.

Mr. Freeman: What is the exhibit number?

Mr. Moore: It was Mercoid's Exhibit J-2, in the Bloomington depositions.

Q. 52. You stated that the Detroit Lubricator Company never did execute a license on the Freeman patent?

1327 A. That is correct.

Mr. Freeman: That is objected to as already having been answered once.

Q. 53. Did they give any reason?

Mr. Freeman: That is objected to as immaterial.

Q. 54. You may answer.

A. Should I answer the question?

Mr. Freeman: Sure.

Q. 55. Yes.

A. There was apparently some difference of opinion as between the management of the company—I am speaking of Detroit Lubricator Company—in their patent department as to whether or not they should take this license.

Mr. Moore: Direct examination closed.

Cross-Examination by Mr. Freeman:

X-Q. 56. Mr. Huff, prior to the letter of May 7, 1940, wherein a typographical error occurred, had you discussed with Mr. McCabe the taking of a license under the Freeman patent?

A. I think I discussed it with Mr. McCabe. I am very certain that I discussed it on more than one occasion with Mr. Courteol, president of Mercoid Corporation.

1328 X-Q. 57. Did you at that time make any mention with respect to 25 per cent as is specified in the letter of May 7, 1940?

A. I am certain that I did not.

X-Q. 58. Did you at that time make any mention of 25 cents?

A. I think probably I did not, because these supplemental letters, as I recall, came to my attention after I submitted to both Mr. McCabe and Mr. Swan a printed copy of the licensing agreement.

Mr. Freeman: That is all.

Mr. Moore: No redirect examination.

Deposition closed.

1329 HAROLD W. SWEATT, called as a witness on behalf of plaintiff, having been first duly sworn, testified as follows:

Direct Examination by Mr. Moore.

Q. 1. Please state your name, age, residence and occupation.

A. Harold W. Sweatt; 49; residence, Palm Beach, Florida; president, Minneapolis-Honeywell Regulator Company.

Q. 2. And how long have you been president?

A. I think since 1936.

Q. 3. And you heard Mr. Huff's testimony as to the predecessor?

A. Yes.

Q. 4. Of the Minneapolis-Honeywell when he was an officer, is that correct?

A. That is correct.

Q. 5. And you also heard his testimony as to the various officers of the Minneapolis-Honeywell who had the power to execute agreements and licenses for the corporation, is that correct?

1330 A. That is correct.

Q. 6. And also the officers named by him as being authorized to execute agreements?

A. That is correct.

Q. 7. You have been acquainted with the officers of The Mercoid Corporation and its predecessor in business, the Federal Gauge Company, for a great many years, have you not?

A. I have.

Q. 8. Of course, you are acquainted with the controversy between Minneapolis-Honeywell and Mercoid involving the Freeman patent?

A. I am.

Q. 9. And that is the controversy upon which you are now being questioned?

A. Yes.

Q. 10 The Freeman patent in question is the one that is referred to by you in your letter of November 28, 1932,

addressed to Mercoid Corporation, which has already been set up in the pleadings. (Handing a document to the witness.)

A. What is your question?

Q. 11. I ask you if this is the Freeman patent in this controversy?

1331 A. Yes.

Q. 12. I believe the pleadings set up that the Freeman patent was assigned to Minneapolis-Honeywell on April 14, 1932, and it was during that year that you called this patent to the attention of The Mercoid Corporation in this letter, was it not?

A. I called their attention on November 29, 1932.

Q. 13. You are familiar, are you not, with the licenses granted by Minneapolis referred to in Mr. Huff's testimony?

A. I am generally familiar with them.

Q. 14. And his statement that the price schedule A was attached to each was correct, was it not?

A. That is correct.

Q. 15. And that price schedule forms a part of each of these license agreements, does it not?

A. That is correct.

Q. 16. I believe that Mr. Huff testified that certain changes or amplifications had been made in those original agreements in accordance with his letter that he referred to of May 7th, and that is that they now incorporated these two paragraphs attached to that letter.

A. There were letters to these licensees covering this general subject. I cannot testify to more than that.

1332 Q. 17. These two paragraphs are apparently prepared for your signature. Do you know whether or not you signed those?

A. I imagine that I did.

Q. 18. The initials in the lower left hand corner would ordinarily indicate that you so dictated them?

A. That would so indicate.

Q. 19. You are an inventor yourself, are you not, Mr. Sweatt?

Mr. Freeman: We will concede that he is the patentee.

A. I suppose the answer would be yes.

Q. 20. You are the patentee named in letters patent 1,665,801 and 1,673,057, set up in the Mercoid pleadings, are you not?

A. I am.

Q. 21. Now, both of these patents include control system or control apparatus for a warm air furnace, do they not, or hot air heating of a room?

Mr. Freeman: You apparently have read these patents recently. Why don't you point out to Mr. Sweatt those parts you want him to refer to, and that would be helpful.

Q. 22. Both of these patents employ a circulating fan, do they not?

1333 A. Yes.

Q. 23. And there is a room thermostat?

A. That is correct.

Q. 24. For controlling the supply of the heating medium to the room?

A. That is correct.

Q. 25. And also for controlling the circulating fan?

A. I am not sure whether it does or not.

Q. 26. Are you familiar with the construction and operation of the Freeman patent that is in suit here?

A. Not very.

Q. 27. You call this Freeman patent a system patent, do you not?

A. I do not know the technical definition of a system patent, but it involves a number of different elements in each of the claims.

Q. 28. I show you your catalog of 1940 and call your attention to page 40. What is the last patent?

A. That is the Freeman patent.

Q. 29. And how is it described there? Just read that.

A. It shows the Freeman patent number and calls it a system patent and specifies the type of controls, broadly.

Q. 30. Each of these licenses contains a definition of combination furnace control and I believe they are

1334 identical in the printed forms as well as in the typewritten form. Are you familiar with that definition?

A. I have read the same.

Q. 31. I notice this definition starts:

"Used in this agreement the expression 'combination furnace control' shall mean a unitary structure, including at least a switching means for controlling not less than two circuits."

What is your understanding of a unitary structure?

Mr. Bair: That is objected to as calling for secondary evidence, and also calling for an opinion which is wholly immaterial to any issue in this case.

Mr. Moore: It is material in this case because this definition specifies the unitary structure and the patent in suit does not disclose a unitary structure, and I, therefore, feel that I am entitled to know the licensor's meaning of this expression.

Mr. Bair: The objection is repeated on the ground that the contract itself is the best evidence.

A. A unitary structure, I assume, means the elements, the combination furnace fan controls, are contained in a single unit.

Q. 32. In a single casing?

A. Yes.

1335 Q. 33. And you sell the unitary structure of that kind?

A. We do.

Q. 34. The definition continues after describing the two switches:

"The structure having permanent internal wiring connecting the switching means to terminals for the connection of external wires thereto."

From that I understand that there are binding posts within the casing to which the switches are connected, is that correct?

A. I believe that is correct.

Q. 35. Now, considering the remainder of that definition, am I to understand that this unitary structure with these binding posts is to be connected only in the manner specified in this definition, or does the Freeman patent cover any and all connections that might be made to these binding posts to control the operation of a fan and the operation of a heat generating medium?

Mr. Bair: That is objected to on the ground that the patent itself is the best evidence as to what it covers, and also on the ground that this witness does not purport to be a patent expert, and that the evidence called for is improper because it is expert testimony.

Mr. Moore: The evidence shows that the witness is an inventor, and is the inventor of a system which might
1336 be called analogous to the Freeman patent, and he should be able to answer that question without having expert knowledge.

A. My answer is I do not know.

Mr. Moore: All right.

Q. 36. Referring to Section 7, Price Condition, in Section (c), are you familiar with that? (Handing document to the witness.)

A. I have read it.

Q. 37. I note that it refers here to:

"No extras shall be included under any circumstances at a price for such extras at less than what said extras are sold at when sold with some other unit or control."

And then it makes an exception:

"Temperature indicating means to indicate the temperature and the thermal means of the 'combination furnace control' and a summer adjustment or locking means to provide fan operation only in the summer shall not be considered for the purpose of this agreement as an extra."

Do you know whether or not Minneapolis-Honeywell owns a patent on a summer adjustment or locking means to provide fan operation only in the summer?

A. I do not know.

Q. 38. Minneapolis either owned a license or owned an Edgecombe patent No. 1,138,854, which was reissued 1337 as Reissue 15,513, did they not? These two patents are set up in the pleadings of the Mercoid Corporation.

A. If my recollection is correct, the Honeywell Heating Specialties Company had a license under this which later went to Minneapolis-Honeywell Company.

Q. 39. That patent showed a summer switch, I believe. Could you tell that offhand?

A. Not without studying it.

Q. 40. The Edgecomb patent was granted in 1915, so it has expired now, has it not?

A. Yes.

Q. 41. In this price schedule, under "Manufacturer's Price," there are four items. The first item is, "The net minimum price for a combination furnace control shall be," and then it is specified.

A. That is right.

Q. 42. That is the combination furnace control such as is included in the definition in the license, is it not?

Mr. Bair: That is objected to for the same reason, as calling for secondary evidence, the license contract itself being the best evidence.

A. One of them, anyhow.

Q. 43. The next item is "The net minimum price for a combination furnace control including a 'summer 1338 switch.'" That is a summer switch that the license specifically excepts as being an extra, is it not?

Mr. Bair: The same objection.

A. I would assume so.

Q. 44. The third item is, "The net minimum price for a combination furnace control operable at two speeds shall be," and then the price.

Mr. Bair: The same objection.

A. I do not see any question in that.

Q. 45. Is a combination control operable at two speeds referred to anywhere in the license agreement that you know of, otherwise than the price schedule?

Mr. Bair: The same objection as last made.

A. I do not believe it is.

Q. 46. Does the Minneapolis-Honeywell own a patent on a combination furnace control operable at two speeds?

A. I do not know.

Q. 47. Is it not a fact that Minneapolis-Honeywell owns the Kriechbaum patent upon a combination furnace control, a patent operable at two speeds?

A. They owned the Kriechbaum patent.

Mr. Freeman: Number?

The Witness: No. 2,222,800, which you have shown me.

Q. 48. Is it not a fact that the application of this 1339 Kriechbaum patent became involved in an interference with a man by the name of Baker while in the Patent Office?

A. I do not know.

Q. 49. And the Baker patent later became patent No. 2,230,446?

A. I do not know.

Mr. Freeman: Who was the Baker patent issued to, Mr. Moore?

The Witness: It was assigned to the Cook Electric Company.

Q. 50. I show you here a certified copy of the assignment, or license agreement, rather, recorded in the United States Patent Office on May 22, 1939, in Liber K 179, page 323, which is an agreement between the Minneapolis-Honeywell Regulator Company and the Cook Electric Company. (Handing document to the witness.) Are you at all familiar with that?

A. I do not think I am.

Q. 51. That was executed by Charles B. Sweatt as vice president, I believe.

A. That is right.

Q. 52. As president, would you not be presumed to know of this agreement?

A. I very probably did at the time, but as to the 1340 details of it, I have no recollection.

Q. 53. Then we would have to ask Mr. Charles B. Sweatt as to details, would we not?

A. I would assume so.

Q. 54. This agreement relates to a pending application of Kriechbaum which bears the same serial number as the Kriechbaum patent I just showed you.

Mr. Freeman: That is objected to. The agreement speaks for itself, and if the serial number coincides with the serial number of the Kriechbaum patent, we will concede that they are one and the same.

Mr. Moore: And you also concede the Baker patent, which serial number corresponds with the serial number in this agreement?

Mr. Freeman: We are not doubting any written agreement, nor are we doubting any serial numbers or any patents issued by the United States.

Q. 55. I call your attention to paragraph 7 of this agreement.

Mr. Bair: This is the Cook agreement?

Mr. Moore: Yes. I will offer it in evidence.

Mr. Freeman: Are you asking him a question, Mr. Moore?

Mr. Moore: No, I am just referring to it and letting him read it.

1341 The Witness: I have read it.

Q. 56. This Section 7 of this agreement, executed March 31, 1939, reads as follows:

"The acceptance of a license this day by Cook Electric Company from Minneapolis-Honeywell Regulator Company under a Freeman patent No. 1,813,732, does not impliedly give any right to the latter company to grant sublicenses to its other licensees under said Freeman patent on two-speed operation as covered by said Baker application or any other application or patent owned or controlled by Cook Electric Company."

The acceptance of a license this day by Cook Electric Company from Minneapolis-Honeywell Regulator Company under the Freeman patent is the license first referred

to as being granted to the Cook Electric Company on the 31st day of March, 1939, is it not?

A. I would assume so. It could not be anything else.

Q. 57. My understanding of that section would be that this agreement prevents Minneapolis-Honeywell from granting sublicenses to its other licensees under the Freeman patent.

Mr. Freeman: That is objected to. The agreement speaks for itself, and as to what the understanding is of Mr. Moore, counsel for Mercoid, it is certainly immaterial in this case.

1342 Q. 58. Answer the question.

A. I do not know what your understanding is.

Q. 59. Well, what is your understanding?

A. My understanding would be that Minneapolis-Honeywell was not impliedly given any rights to grant such licenses under the other licenses under the Freeman patent.

Mr. Freeman: Will you please read that last answer?

(The answer was read as above recorded.)

Q. 60. I believe you stated that you did not know or were not acquainted with any of the negotiations leading up to this Cook agreement, either the original license or this one.

A. I do not want to state that because very possibly at the time I was. What I meant to say is that I do not recollect the details of this agreement, when you showed it to me.

Q. 61. Then you might have been present at conferences in which this interference was negotiated?

A. I do not believe I was, but I might have been familiar with the negotiations at the time.

Q. 62. Could you state whether or not Mr. Charles B. Sweatt, who signed both of these agreements for the company, would be more interested in these negotiations and have a better recollection?

1343 A. I would doubt it, because generally he is not very familiar with patent matters. I do not recollect how these came up.

Q. 63. You generally handle the patent matters?

A. Only from a broad policy standpoint.

Q. 64. The Mr. Fisher who is here today,—is he connected with any departments of Minneapolis-Honeywell?

A. He is.

Q. 65. What position does he hold?

A. He is head of our—he is patent attorney for the company.

Q. 66. Would he be present at negotiations of settlement of an interference?

A. Ordinarily, he would.

Q. 67. You stated that you are mainly interested in the policy of the company in connection with patent matters.

A. Yes.

Q. 68. It is the policy of the company to notify alleged infringers of any infringement of a patent, is it not?

A. Generally speaking.

Q. 69. And that you will grant them a license, in most instances, if they ask for it?

A. Not necessarily.

1344 Q. 70. Can you state whether or not between the time Minneapolis-Honeywell became the owner of this Freeman patent in 1932 and the time that the Cook Electric license was granted in 1939 you sent out notices of infringement to alleged infringers?

A. I believe we did.

Q. 71. Is it not a fact that you did notify the White Manufacturing Company, manufacturers of electrical supplies, in St. Paul, Minnesota, that they were infringing the Freeman patent in 1938?

A. My memory is not clear one way or the other.

Q. 72. Is the name White Manufacturing Company at all familiar to you?

A. Yes, I know the White Manufacturing Company.

Q. 73. And you might possibly have sent them a notice?

A. We might have sent them one.

Q. 74. They never took a license. The record shows that a license was never granted the White Manufacturing Company, does it not?

A. I do not know what is in the record, Mr. Moore.

Q. 75. Here are the five licenses. There were no other licenses granted under the Freeman patent than the ones that were presented?

A. I know of no other licenses.

1344 Q. 76. Referring to the Freeman patent in suit, that shows a room thermostat, does it not?

A. It does.

Q. 77. And the Minneapolis-Honeywell and their predecessors both manufactured room thermostats for a long time?

A. They did.

Q. 78. It also shows a warm air furnace control; indicated by 24, I think.

A. It shows a switch of the type which opens the circuit when a predetermined temperature has been exceeded.

Q. 79. That is called a warm air furnace control, is it not?

Mr. Bair: You mean that it is called that in the patent?

Mr. Moore: He just said what the patent stated there, and I am asking him if that is what they term a warm air furnace control.

A. It is used on a warm air furnace.

Q. 80. The Minneapolis-Honeywell made switches of that character long before the Freeman patent came out, did they not?

Mr. Freeman: Mr. Moore, do you mean furnace controls generally, or do you mean furnace controls of the
1346 kind specifically referred to in the Freeman patent?

Mr. Moore: Now, just a minute. The paragraph beginning line 6, page 2, of the Freeman patent reads as follows:

"The switch 24 is of the type which opens its circuit when a predetermined temperature has been exceeded. This temperature is so chosen that the circuit within the switch is opened when the furnace has been heated to such a point that further heating might prove dangerous."

And the furnace as disclosed in figure 2 is a warm air furnace. Now, the question is did Minneapolis-Honeywell make switches which answer this description long before the Freeman patent was granted?

A. I think they did.

Q. 81. This patent also shows a booster fan or a fan for increasing the circulation through the warm air furnace in figure 2, and it shows a dotted square indicated by the number 23. The paragraph beginning line 89, page 1 of the patent, states:

"The switch 23 is of a type which closes its circuit only when a predetermined temperature is exceeded. This temperature is so chosen that the circuit within the switch 23 is only completed when the furnace hood has been heated to a temperature greater than normal room temperature. Thus the fan 21 will not be operated if the furnace has not reached a temperature at which the air would be heated above room temperature. In other words, the fan 21 can never operate to force unheated air into the rooms
1347 to be heated while this control is in operation."

Now, do you know whether or not Minneapolis-

Honeywell put on the market controls which would answer that description of that switch?

A. I do not know.

Q. 82. Your catalogs would show it, would they not?

A. They should.

Q. 83. According to your last answer, you are not quite positive what controls Minneapolis-Honeywell makes, are you?

A. I cannot be familiar with the details of all of them.

Q. 84. Is there any official in your company who would know all the details of the various controls that you make?

A. I am afraid there would be no official that would know the details of all of them.

Q. 85. Is there any employe in your company who would particularly qualify as to that?

A. I doubt if there would be any one employe who would know the details of all of them.

Q. 86. I understood you to say you were only interested in the broad principles of policy in connection with your patents. Is there any official in your company whose responsibility is to know thoroughly the contents of
1348 your various licenses and agreements that are issued or granted by the company?

A. One official who would know all?

Q. 87. Yes.

A. I do not believe so.

Q. 88. Then you do not let your right hand know what your left hand is doing?

A. If you have too many details one person cannot know them all. That is all there is to that.

Q. 89. I understood you to say that Mr. Charles B. Sweatt as vice president would be more familiar than you in connection with the granting of the license to Cook and the exchange of licenses.

A. I did not say that.

Q. 90. Well, is there anybody in the company who would be more familiar than you are with those circumstances?

A. I think probably Mr. Fisher might be.

Q. 91. Then if we want any more detailed information we would have to ask Mr. Fisher?

A. I would think so.

Q. 92. Do you establish the policy for issuing licenses under these patents?

Mr. Freeman: You mean Mr. Sweatt personally?

Mr. Moore: He said he was mostly interested in
1349 the broad policies of the company in connection with patents.

A. I might or might not, Mr. Moore.

Q. 93. Would Mr. Fisher actually prepare the terms of these license agreements?

A. Mr. Fisher or other counsel that we might use.

Q. 94. And Mr. Freeman of Bair & Freeman might also?

A. Mr. Freeman might.

Q. 95. Does Mr. Bair also prepare licenses for the company, do you know, or does Mr. Freeman generally handle that for the firm?

A. I think Mr. Bair might have. I would not remember.

Q. 96. Then do you rely upon the advice of your attorneys in establishing policies on these licenses and the terms of the licenses?

A. That is what we hire them for.

Mr. Moore: I believe I have referred to certain documents which I would like to offer in evidence before I finish with this witness.

I offer a soft copy of the Baker patent in evidence as MERCOID EXHIBIT L.

(The patent was so marked.)

Mr. Freeman: It is objected to as immaterial to any issue or controversy here involved as between Mercoid and Minneapolis-Honeywell Regulator Company.

Form No. 44

MANUFACTURERS' PURCHASE CONTRACT

THE MERCOID CORPORATION

4201 BELMONT AVE. #4 CHICAGO, ILL.

2-16-38
Rec'd initial order for 261 controls

THIS AGREEMENT, entered into between THE MERCOID CORPORATION, a Delaware corporation, hereinafter called the "COMPANY," and Herco Oil Burner Corp. of Lancaster, Pa. hereinafter called the "PURCHASER."

Witnesseth:

WHEREAS the COMPANY is engaged in manufacturing automatic electric controls for heating, refrigerating, air conditioning and other apparatus, machinery and equipment, and

WHEREAS the PURCHASER is desirous of purchasing such controls for use in connection with products of the PURCHASER'S own manufacture,

NOW, THEREFORE, in consideration of the premises and of the mutual covenants hereinafter set forth the parties hereto agree as follows:

QUANTITY

Subject to the terms and provisions hereinafter contained, the COMPANY agrees to sell and the PURCHASER agrees to purchase, during the term of this agreement, ... units of the COMPANY'S automatic controls (each unit consisting of one of the controls listed herein), at the prices shown.

MISCELLANEOUS CONTROLS AND CONTROL EQUIPMENT

Miscellaneous automatic controls and control equipment of the COMPANY'S manufacture, not listed herein but shown in the COMPANY'S catalogue attached hereto, will be furnished at the catalogue list prices less the discounts shown on the manufacturers' discount sheet attached hereto. The list prices and discounts shall be subject to change at any time and from time to time, without notice. All orders for such miscellaneous controls and control equipment shall be subject to acceptance and approval by the COMPANY.

TERM OF AGREEMENT

This agreement shall become effective on the date of acceptance by the COMPANY and shall continue to and including December 31, 1938, unless sooner terminated as herein provided.

TERMS OF PAYMENT

All shipments shall be made f.o.b. the point of shipment with Factory Sight Draft attached to the Bill of Lading, the COMPANY to have the right to designate the point of shipment. If the draft is paid within 10 days from the date of the invoice a special cash discount of two per cent. (2%) will be allowed. If PURCHASER desires open account credit accommodation arrangements therefor should be made with the COMPANY'S credit department. If such arrangements are made invoices will be due net thirty days after the date of the invoice and a cash discount of two per cent. (2%) will be allowed if payment is made within 10 days from the invoice date. Credit terms and delivery of all equipment are subject to the COMPANY'S approval and the COMPANY shall have the right at all times to change or alter the terms of payment and to fix, change or alter such credit accommodations as may be extended to PURCHASER. Sales, excise and other taxes will be added to all prices and the amount of such taxes shall not be subject to discount. Invoices covering emergency shipments from a Branch Office of the COMPANY shall be subject to such discounts as are in effect at such Branch Office at the time of shipment, anything herein contained to the contrary notwithstanding.

USE OF CONTROLS BY PURCHASER

This agreement is made upon the understanding and condition that PURCHASER, who is a manufacturer, will not use or sell the controls or appliances purchased pursuant hereto except as a part of or in conjunction with machinery or equipment of PURCHASER'S own manufacture. If PURCHASER shall use or sell such controls or appliances otherwise than as above specified the COMPANY shall have the right to immediately terminate this agreement without notice.

IMPOSSIBILITY OF PERFORMANCE

The COMPANY agrees that it will, in good faith and to the best of its ability, promptly fill all orders received from PURCHASER and deliver the same to the carrier for shipment; provided, however, that the COMPANY shall not be obliged to fill orders in the event and to the extent that it may become impossible to do so because of war conditions, governmental regulations, strikes, labor disturbances, fires, floods, tornados, acts of God, mechanical breakdowns, shortages of raw materials, delays in receipt of raw materials and any other causes or conditions beyond the control of the COMPANY.

ASSIGNMENT OF CONTRACT

The PURCHASER shall not assign this contract or any interest therein without the written consent of the COMPANY.

PRICE REVISIONS

The COMPANY reserves the right to change and revise the prices listed herein upon thirty (30) days' written notice to PURCHASER. Revised prices shall apply to all orders received by the COMPANY after the expiration of the thirty (30) day notice period and also to all unfilled orders, including blanket orders, in the COMPANY'S possession at the expiration of such period. If the revised prices are not satisfactory to PURCHASER the PURCHASER may terminate this agreement by written notice received by the COMPANY within fifteen (15) days from the expiration of the aforesaid thirty (30) day period; provided, however, that such termination shall not affect completion of any orders received by the COMPANY prior to the COMPANY'S receipt of the PURCHASER'S notice of termination. During the aforesaid thirty (30) day price change notice period the PURCHASER may not order more than one-twelfth of the number of control units herein agreed to be purchased, or, at the COMPANY'S option, more than an equivalent number of control units shipped to PURCHASER during the same period of the previous year.

MERCOID EXHIBIT R-1

Form No. 44

CONTROL UNITS AND PRICES

	List Price	SINGLE SHIPMENT QUANTITIES: 1 to 99 Assorted	100 to 249 Assorted	250 up Assorted
PRIMARY CONTROLS				
Type KMW Pyratherm	$23.00	$ 9.25	$ 9.00	$ 8.70
Type KMI Pyratherm	24.00	9.75	9.50	9.20
SPECIAL NOTE: DEDUCT 50c EACH NET FROM THE RESPECTIVE ASSORTED QUANTITY PRICES BELOW WHEN ORDERING 10 OR MORE INSTRUMENTS OF ONE TYPE AND SPECIFICATION.				
THERMOSTATS				
Type H Sensatherm (Standard) 55-85°, with Thermometer	6.00	3.50	3.35	3.20
Type DNH Sensatherm, 55-85°, with Thermometer	16.00	8.50	8.50	8.50
Type HH Dual Sensatherm, 55-85°, with Thermometer	12.50	6.50	6.50	6.50
Type T-41 Timercoid and Transformer, 110-24 V., 60 cyc.	20.00	10.25	10.25	10.25
No. 855 Line Voltage Thermostat, with Thermometer	10.00	5.50	5.25	5.00
LIMIT CONTROLS				
Type DA-31 Steam Control, 0 to 14 lb.	6.00	3.35	3.25	3.25
Fig. 35 Risertherm (Clamp-on) Hot Water Control	6.00	3.35	3.25	3.25
Type 115W Immersatherm, 50 to 250° F.	8.00	4.35	4.25	4.25
Type DA-36 or DA-37 Immersion Hot Water	11.00	5.75	5.75	5.75
Type M-51 or M-53 Warm Air Fan or Limit	8.00	4.35	4.25	4.25
Type M-80 Combination Fan and Limit	14.00	7.50	7.25	7.00
Type DA-121 Combination Low Water and Pressure, 0 to 14 lb.	22.00	11.50	11.25	11.00
Type 123 Low Water Only, 30 lb. Max.	15.00	7.85	7.75	7.75

OTHER STANDARD OR ODD MODEL CONTROLS AT PREVAILING MANUFACTURERS PRICES

PRICES RELATING TO ALL CONTROLS ARE FOR 110 OR 220 VOLT, 60 CYCLE SPECIFICATIONS ONLY, UNLESS OTHERWISE SPECIFIED.

SPECIAL UNITS AND PRICES

GUARANTEE AND RETURNS

The COMPANY guarantees all control units and equipment manufactured by it and bearing its name or mark to be free from defects in workmanship and material. The COMPANY will, without charge, replace or repair within one year from date of shipment from the COMPANY'S factory any control unit or equipment that may be found to be defective upon inspection at the COMPANY'S factory. This guarantee does not obligate the COMPANY in any manner in cases where control units or equipment have been subjected to careless handling, improper application or faulty installation. In all cases the COMPANY'S liability on the guarantee herein expressed shall be limited to the repair or replacement of the defective control or equipment and in no event shall its liability extend to indirect or consequential damages. The guarantee herein expressed is made in lieu of all other warranties, guaranties, obligations, or liabilities expressed or implied by the COMPANY or its representatives. All statutory or implied warranties, other than of title, are hereby expressly negatived and excluded.

Returns must not be made without the COMPANY'S consent and in all cases the returned controls or equipment must be carefully handled, properly packed and shipped prepaid. If credit is allowed for returns the COMPANY will deduct ten per cent (10%) to cover handling and inspection charges and a further deduction will be made where recalibrating or refinishing is necessary. Specially made controls may not be returned for credit except at what the COMPANY determines is a fair value for the same.

PATENT WARRANTY

The COMPANY agrees that it will, at its own expense, defend any suit or proceeding that may be instituted against the PURCHASER based upon a claim that any apparatus of the COMPANY'S manufacture furnished by the COMPANY to the PURCHASER constitute an infringement of any Letters Patent of the United States, provided, that the PURCHASER shall not be in default hereunder and shall cause the COMPANY to be promptly notified in writing of such suit and shall give the COMPANY authority to defend such suit through the COMPANY'S counsel and shall furnish to the COMPANY all needed information and assistance for the defense of such suit. The COMPANY will pay all damages and costs awarded against PURCHASER in any suit defended by the COMPANY, provided notice of such suit and authority, information and assistance shall have been given to the COMPANY as aforesaid, and in the event the device or apparatus furnished by the COMPANY, or any part thereof, is held to constitute infringement and its use is enjoined the COMPANY will, at its own expense and at the COMPANY'S option, either procure for the PURCHASER the right to continue using the infringing devices or apparatus; or replace the same with non-infringing devices or apparatus; or modify the infringing devices or apparatus so that they become non-infringing; or accept the return of the infringing devices or apparatus and refund the purchase price thereof. The foregoing constitutes the COMPANY'S only liability in connection with patent infringement by devices or apparatus furnished by the COMPANY.

Whenever the COMPANY deems it necessary for any reason whatsoever to discontinue the sale of any of the products of the COMPANY, the COMPANY agrees to give written notice to the PURCHASER to discontinue the sale of such products, and the PURCHASER agrees, upon receipt of such notice, to make no further sales or installations of any such products unless or until authorized so to do in writing by the COMPANY.

TERMINATION

In addition to any and all other provisions herein contained relating to termination or cancellation of this agreement, the following circumstances are hereby agreed to be and shall be deemed to be conclusive evidence of the breach of this agreement by either of the parties hereto, and in any of these events the other party hereto may, at its election, without prejudice to any other remedy it may have, terminate all further obligations on the part of such non-defaulting party made and to be performed under this agreement.

(a) The breach of or the failure to comply with any or all of the terms, covenants, conditions and provisions of this agreement, and a continuance of such breach for thirty or more days after receipt by the defaulting party of written notice thereof.

(b) The adjudicated bankruptcy, either voluntary or involuntary or the adjudicated insolvency of either party hereto, or the making of an assignment for the benefit of creditors or the appointment of a trustee or receiver for either of the parties hereto.

(c) The repudiation of this agreement, in whole or in part, by either party hereto.

FIELD SERVICE

The COMPANY will welcome the opportunity of cooperating with the PURCHASER in educating the PURCHASER'S factory personnel in the servicing and the proper installation of the COMPANY'S controls but the COMPANY does not agree or bind itself to render any such service.

The foregoing constitutes the entire agreement between the parties hereto and no change, alteration or modification of this agreement shall be binding unless reduced to writing and signed by the respective parties hereto. The validity, enforceability and interpretation of this agreement shall be determined and governed by the laws of the State of Illinois.

Mercoid Burner Control

By [signature] Pres.

Title

THE MERCOID CORPORATION

By

Title

DATE SUBMITTED: Feb 7-38

DATE ACCEPTED

MANUFACTURERS' PURCHASE CONTRACT

THE MERCOID CORPORATION

4201 BELMONT AVE. CHICAGO, ILL.

Day Submitted Feb. 11, 1939

THIS AGREEMENT, entered into between THE MERCOID CORPORATION, a Delaware corporation, hereinafter called the "COMPANY," and Horco Oil Burner Corp.

of 103 W. Chestnut St., Lancaster, Pa.

hereinafter called the "PURCHASER."

Witnesseth:

WHEREAS the COMPANY is engaged in manufacturing automatic electric controls for heating, refrigerating, air conditioning and other apparatus, machinery and equipment, and

WHEREAS the PURCHASER is desirous of purchasing such controls for use in connection with products of the PURCHASER'S own manufacture,

NOW, THEREFORE, in consideration of the premises and of the mutual covenants hereinafter set forth the parties hereto agree as follows:

QUANTITY

Subject to the terms and provisions hereinafter contained, the COMPANY agrees to sell and the PURCHASER agrees to purchase, during the term of this agreement, their requirements of the COMPANY'S automatic controls. The special net prices extended herewith by the COMPANY are based on the PURCHASER'S 1939 control requirements estimated to be 15,000 units.

MISCELLANEOUS CONTROLS AND CONTROL EQUIPMENT

Miscellaneous automatic controls and control equipment of the COMPANY'S manufacture, not listed herein but shown in the COMPANY'S catalogue attached hereto, will be furnished at the catalogue list prices less the discounts shown on the manufacturers' discount sheet attached hereto. The list prices and discounts shall be subject to change at any time and from time to time, without notice. All orders for such miscellaneous controls and control equipment shall be subject to acceptance and approval by the COMPANY.

TERM OF AGREEMENT

This agreement shall become effective on the date of acceptance by the COMPANY and shall continue to and including December 31, 1939, unless sooner terminated as herein provided.

TERMS OF PAYMENT

All shipments shall be made f.o.b. the point of shipment with Factory Sight Draft attached to the Bill of Lading, the COMPANY to have the right to designate the point of shipment. If the draft is paid within 10 days from the date of the invoice a special cash discount of two per cent. (2%) will be allowed. If PURCHASER desires open account credit accommodation arrangements therefor should be made with the COMPANY'S credit department. If such arrangements are made invoices will be due net thirty days after the date of the invoice and a cash discount of two per cent. (2%) will be allowed if payment is made within 10 days from the invoice date. Credit terms and delivery of all equipment are subject to the COMPANY'S approval and the COMPANY shall have the right at all times to change or alter the terms of payment and to fix, change or alter such credit accommodations as may be extended to PURCHASER. Sales, excise and other taxes will be added to all prices and the amount of such taxes shall not be subject to discount. Invoices covering emergency shipments from a Branch Office of the COMPANY shall be subject to such discounts as are in effect at such Branch Office at the time of shipment, anything herein contained to the contrary notwithstanding.

USE OF CONTROLS BY PURCHASER

This agreement is made upon the understanding and condition that PURCHASER, who is a manufacturer, will not use or sell the controls or appliances purchased pursuant hereto except as a part of or in conjunction with machinery or equipment of PURCHASER'S own manufacture. If PURCHASER shall use or sell such controls or appliances otherwise than as above specified the COMPANY shall have the right to immediately terminate this agreement without notice.

IMPOSSIBILITY OF PERFORMANCE

The COMPANY agrees that it will, in good faith and to the best of its ability, promptly fill all orders received from PURCHASER and deliver the same to the carrier for shipment; provided, however, that the COMPANY shall not be obliged to fill orders in the event and to the extent that it may become impossible to do so because of war conditions, governmental regulations, strikes, labor disturbances, fires, floods, tornados, acts of God, mechanical breakdowns, shortages of raw materials, delays in receipt of raw materials and any other causes or conditions beyond the control of the COMPANY.

ASSIGNMENT OF CONTRACT

The PURCHASER shall not assign this contract or any interest therein without the written consent of the COMPANY.

PRICE REVISIONS

The COMPANY reserves the right to change and revise the prices listed herein upon thirty (30) days' written notice to PURCHASER. Revised prices shall apply to all orders received by the COMPANY after the expiration of the thirty (30) day notice period and also to all unfilled orders, including blanket orders, in the COMPANY'S possession at the expiration of such period. If the revised prices are not satisfactory to PURCHASER then PURCHASER may terminate this agreement by written notice received by the COMPANY within fifteen (15) days from the expiration of the aforesaid thirty (30) day period, provided, however, that such termination shall not affect completion of any orders received by the COMPANY prior to the COMPANY'S receipt of the PURCHASER'S notice of termination. During the aforesaid thirty (30) day price change notice period the PURCHASER may not order more than one-twelfth of the number of control units herein agreed to be purchased or, at the COMPANY'S option, more than an equivalent number of control units shipped to PURCHASER during the same period of the previous year.

MERCOID EXHIBIT R-2

Form No. B44

CONTROL UNITS AND PRICES

	List Price	Net Price
PRIMARY CONTROLS		
Type KMW Pyratherm—Constant Ignition Type	$19.00	$ 8.00
Type KMI Pyratherm—Intermittent Ignition Type	22.00	9.90
Type RMI Pyratherm—Int. Ign., Recycling Type	22.00	9.90
THERMOSTATS		
LOW VOLTAGE TYPES		
Type H Sensatherm (Standard) 55-85°, with Thermometer	6.00	2.70
Type DNH Day-Night Sensatherm, with Thermometer	17.00	8.50
Type HH Dual Sensatherm, with Thermometer	12.50	4.75
Type T-41 Timercoid and Transformer, 110-24V., 60 Cyc.	20.00	9.75
Type HBH Two-Stage Sensatherm, with Thermometer	11.00	5.10
Type HBR Two-Stage Sensatherm, with Thermometer	11.00	5.10
LINE VOLTAGE TYPES		
Type HA Sensatherm, with Thermometer, Max. 20 Watts	6.50	3.00
No. 855 Thermostat, with Thermometer, 10 Amp.-115 Volt	10.00	4.50
No. 855 Thermostat, without Thermometer, 10 Amp.-115 Volt	9.00	4.00
TRANSFORMER—RELAYS		
Type V2-3A, S.P.S.T. 10 Amp.-115 Volt	8.00	4.05
Type V2-105 590 with Built-in Summer Switch	13.00	6.00
LIMIT CONTROLS		
STEAM		
Type DA-31, 0 to 14 lb.	6.00	2.75
Type DA-31, Vapor-Vacuum, 10" vac. to 12 lb.	8.00	4.20
Type DA-31, 0 to 35 lb.	8.50	4.45
Type DA-31, 0 to 60 lb.	8.50	4.45
Type DA-31, 0 to 100 lb.	9.00	4.60
Type DA-31, 0 to 150 lb.	9.50	4.85
HOT WATER		
Fig. 35 Risertherm (Clamp-On Type), 110 to 200°F.	6.00	2.75
Fig. 34 Risertherm, 140-230°F. (closes on rise in temp.)	7.00	3.25
Type 115W Immersatherm, 50 to 250° (opens on rise in temp.)	7.00	3.50
Type 115W-3 Immersatherm, 50 to 250° (closes on rise in temp.)	7.00	3.50
Type DA-36 Straight Stem Immersion, 110 to 200° or 135 to 235°	10.00	4.75
Type DA-37 Back Angle Stem Immersion, 110 to 200° or 135 to 235°	10.00	4.75
WARM AIR		
Type M-51 Limit Control	8.00	3.75
Type M-53 Fan Control	8.00	3.75
Type M-53 SW Fan Control with Summer Switch	8.50	4.00
*Type M-80 or M-80B Combination Fan and Limit Control	11.00	5.35
*Type M-82 or M-82B Combination Fan and Limit Control	12.00	5.85
*Type M-84 or M-84B Combination Fan and Limit Control	12.00	5.85
Type 116 Ductatherm, 50 to 300°	7.00	3.50

*FURNISHED STANDARD WITH BUILT-IN SUMMER SWITCH

CONTROL UNITS AND PRICES (CONT'D.)

LOW WATER CONTROLS	List Price	Net Price
Type DA-121 Combination Pressure and Low Water, 0 to 14 lb	$20 00	$10 25
Type DA-121 Combination Pressure and Low Water, Range 0 to 14 lb Complete with Quick Hook-Up	23 00	11 75
Type 123 Low Water Cut-Out, 30 lb Max	14 00	7 00
Type 123 Low Water Cut-Out, 30 lb Max , Complete with Quick Hook-Up Attachments	17 00	8 50

OTHER STANDARD OR ODD MODEL CONTROLS AT LIST PRICE LESS PREVAILING MANUFACTURERS DISCOUNTS. NET PRICE CONTROLS LISTED ABOVE MAY BE INCLUDED IN SINGLE SHIPMENT ORDERS TO OBTAIN QUANTITY DISCOUNTS ON THE LIST PRICE ITEMS SPECIFIED

*PRICES RELATING TO ALL CONTROLS ARE FOR STANDARD RANGES AS LISTED IN CATALOG AND FOR 115 VOLT 60 CYCLE SPECIFICATIONS ONLY, UNLESS OTHERWISE SPECIFIED

SPECIAL UNITS AND PRICES

The COMPANY guarantees all control units and equipment manufactured by it and bearing its name or mark to be free from defects in workmanship and material. The COMPANY will, without charge, replace or repair within one year from date of shipment from the COMPANY'S factory any control unit or equipment that may be found to be defective upon inspection at the COMPANY'S factory. This guarantee does not obligate the COMPANY in any manner in cases where control units or equipment have been subjected to careless handling, improper application or faulty installation. In all cases the COMPANY'S liability on the guarantee herein expressed shall be limited to the repair or replacement of the defective control or equipment and in no event shall its liability extend to indirect or consequential damages. The guarantee herein expressed is made in lieu of all other warranties, guaranties, obligations, or liabilities expressed or implied by the COMPANY or its representatives. All statutory or implied warranties, other than of title, are hereby expressly negatived and excluded.

GUARANTEE AND RETURNS

Returns must not be made without the COMPANY'S consent and in all cases the returned controls or equipment must be carefully handled, properly packed and shipped prepaid. If credit is allowed for returns the COMPANY will deduct ten per cent. (10%) to cover handling and inspection charges and a further deduction will be made where recalibrating or refinishing is necessary. Specially made controls may not be returned for credit except at what the COMPANY determines is a fair value for the same.

The COMPANY agrees that it will, at its own expense, defend any suit or proceeding that may be instituted against the PURCHASER based upon a claim that any apparatus of the COMPANY'S manufacture furnished by the COMPANY to the PURCHASER constitute an infringement of any Letters Patent of the United States, provided, that the PURCHASER shall not be in default hereunder and shall cause the COMPANY to be promptly notified in writing of such suit and shall give the COMPANY authority to defend such suit through the COMPANY'S counsel and shall furnish to the COMPANY all needed information and assistance for the defense of such suit. The COMPANY will pay all damages and costs awarded against PURCHASER in any suit defended by the COMPANY, provided notice of such suit and authority, information and assistance shall have been given to the COMPANY as aforesaid, and in the event the device or apparatus furnished by the COMPANY, or any part thereof, is held to constitute infringement and its use is enjoined the COMPANY will, at its own expense and at the COMPANY'S option, either: procure for the PURCHASER the right to continue using the infringing devices or apparatus; or replace the same with non-infringing devices or apparatus; or modify the infringing devices or apparatus so that they become non-infringing; or accept the return of the infringing devices or apparatus and refund the purchase price thereof. The foregoing constitutes the COMPANY'S only liability in connection with patent infringement by devices or apparatus furnished by the COMPANY.

PATENT WARRANTY

Whenever the COMPANY deems it necessary for any reason whatsoever to discontinue the sale of any of the products of the COMPANY, the COMPANY agrees to give written notice to the PURCHASER to discontinue the sale of such products, and the PURCHASER agrees, upon receipt of such notice, to make no further sales or installations of any such products unless or until authorized so to do in writing by the COMPANY.

In addition to any and all other provisions herein contained relating to termination or cancellation of this agreement, the following circumstances are hereby agreed to be and shall be deemed to be conclusive evidence of the breach of this agreement by either of the parties hereto, and in any of these events the other party hereto may, at its election, without prejudice to any other remedy it may have, terminate all further obligations on the part of such non-defaulting party made and to be performed under this agreement:

TERMINATION

(a) The breach of or the failure to comply with any or all of the terms, covenants, conditions and provisions of this agreement, and a continuance of such breach for thirty or more days after receipt by the defaulting party of written notice thereof.

(b) The adjudicated bankruptcy, either voluntary or involuntary or the adjudicated insolvency of either party hereto, or the making of an assignment for the benefit of creditors or the appointment of a trustee or receiver for either of the parties hereto.

(c) The repudiation of this agreement, in whole or in part, by either party hereto.

The COMPANY will welcome the opportunity of cooperating with the PURCHASER in educating the PURCHASER'S factory personnel in the servicing and the proper installation of the COMPANY'S controls but the COMPANY does not agree or bind itself to render any such service.

FIELD SERVICE

The foregoing constitutes the entire agreement between the parties hereto and no change, alteration or modification of this agreement shall be binding unless reduced to writing and signed by the respective parties hereto. The validity, enforceability and interpretation of this agreement shall be determined and governed by the laws of the State of Illinois.

Purchaser

By

Title

THE MERCOID CORPORATION

By

Title

DATE ACCEPTED

MANUFACTURERS' PURCHASE CONTRACT

THE MERCOID CORPORATION

4201 BELMONT AVE. CHICAGO, ILL.

Date Submitted Jan. 27, 1940

THIS AGREEMENT, entered into between THE MERCOID CORPORATION, a Delaware corporation, hereinafter called the "COMPANY," and Hercules Oil Burner Corporation of 109 W. Chestnut Street, Lancaster, Pennsylvania, hereinafter called the "PURCHASER."

Witnesseth:

WHEREAS the COMPANY is engaged in manufacturing automatic electric controls for heating, refrigerating, air conditioning and other apparatus, machinery and equipment, and

WHEREAS the PURCHASER is desirous of purchasing such controls for use in connection with products of the PURCHASER'S own manufacture,

NOW, THEREFORE, in consideration of the premises and of the mutual covenants herein after set forth the parties hereto agree as follows:

QUANTITY

Subject to the terms and provisions hereinafter contained, the COMPANY agrees to sell and the PURCHASER agrees to purchase, during the term of this agreement, their requirements of the COMPANY'S automatic controls. The special net prices extended herewith by the COMPANY are based on the PURCHASER'S 1940 control requirements estimated to be 15,000 units.

TERM OF AGREEMENT

This agreement shall become effective on the date of acceptance by the COMPANY and shall continue to and including December 31, 1940, unless sooner terminated as herein provided.

TERMS OF PAYMENT

All shipments shall be made f.o.b. the point of shipment with Factory Sight Draft attached to the Bill of Lading, the COMPANY to have the right to designate the point of shipment. If the draft is paid within 10 days from the date of the invoice a special cash discount of two per cent. (2%) will be allowed. If PURCHASER desires open account credit accommodation arrangements therefor should be made with the COMPANY'S credit department. If such arrangements are made invoices will be due net thirty days after the date of the invoice and a cash discount of two per cent. (2%) will be allowed if payment is made within 10 days from the invoice date. Credit terms and delivery of all equipment are subject to the COMPANY'S approval and the COMPANY shall have the right at all times to change or alter the terms of payment and to fix, change or alter such credit accommodations as may be extended to PURCHASER. Sales, excise and other taxes will be added to all prices and the amount of such taxes shall not be subject to discount. Invoices covering emergency shipments from a Branch Office of the COMPANY shall be subject to such discounts as are in effect at such Branch Office at the time of shipment, anything herein contained to the contrary notwithstanding.

USE OF CONTROLS BY PURCHASER

This agreement is made upon the understanding and condition that PURCHASER, who is a manufacturer, will not use or sell the controls or appliances purchased pursuant hereto except as a part of or in conjunction with machinery or equipment of PURCHASER'S own manufacture. If PURCHASER shall use or sell such controls or appliances otherwise than as above specified the COMPANY shall have the right to immediately terminate this agreement without notice.

IMPOSSIBILITY OF PERFORMANCE

The COMPANY agrees that it will, in good faith and to the best of its ability, promptly fill all orders received from PURCHASER and deliver the same to the carrier for shipment; provided, however, that the COMPANY shall not be obliged to fill orders in the event and to the extent that it may become impossible to do so because of war conditions, governmental regulations, strikes, labor disturbances, fires, floods, tornados, acts of God, mechanical breakdowns, shortages of raw materials, delays in receipt of raw materials and any other causes or conditions beyond the control of the COMPANY.

ASSIGNMENT OF CONTRACT

The PURCHASER shall not assign this contract or any interest therein without the written consent of the COMPANY.

PRICE REVISIONS

The COMPANY reserves the right to change and revise the prices listed herein upon thirty (30) days' written notice to PURCHASER. Revised prices shall apply to all orders received by the COMPANY after the expiration of the thirty (30) day notice period and also to all unfilled orders, including blanket orders, in the COMPANY'S possession at the expiration of such period. If the revised prices are not satisfactory to PURCHASER the PURCHASER may terminate this agreement by written notice received by the COMPANY within fifteen (15) days from the expiration of the aforesaid thirty (30) day period; provided, however, that such termination shall not affect completion of any orders received by the COMPANY prior to the COMPANY'S receipt of the PURCHASER'S notice of termination. During the aforesaid thirty (30) day price change notice period the PURCHASER may not order more than one-twelfth of the number of control units herein agreed to be purchased, or, at the COMPANY'S option, more than an equivalent number of control units shipped to PURCHASER during the same period of the previous year.

Form No. LB 3

CONTROL UNITS AND PRICES

	List Price	Net Price
PRIMARY CONTROLS		
Type JM Pyratherm—Constant Ignition Type	$19 00	$ [illegible] 7.75
Type JMI Pyratherm—Intermittent Ignition Type	21 00	[illegible] 8.25
Type RMI Pyratherm—Int. Ign., Recycling Type	22 00	[illegible] 9.20
THERMOSTATS		
LOW VOLTAGE TYPES		
Type H Sensatherm (Standard) 55-85°, with Thermometer	6 00	[illegible] 2.50
Type DNH Day-Night Sensatherm, with Thermometer	17 00	8 50
Type HH Dual Sensatherm, with Thermometer	11 00	4 75
Type T-41 Timercoid and Transformer, 110-24V., 60 Cyc.	21 50	9 75
Type HBH Two-Stage Sensatherm, with Thermometer	11 00	4 75
Type HBR Two-Stage Sensatherm, with Thermometer	11 00	4 75
LINE VOLTAGE TYPES		
Type HA Sensatherm, with Thermometer, Max. 20 Watts	6 50	2 95
No. 855 Thermostat, with Thermometer, 10 Amp.-115 Volt	10 00	4 50
No. 855 Thermostat, without Thermometer, 10 Amp.-115 Volt	9 00	4 00
TRANSFORMER—RELAYS		
Type V2-3A, S.P.S.T. 10 Amp.-115 Volt	8 50	3 95
Type V2-105-590 with Built-in Summer Switch	15 00	7 00
LIMIT CONTROLS		
STEAM		
Type DA-31, 0 to 14 lb.	6 00	2 75
Type DA-31, Vapor-Vacuum, 10" vac. to 12 lb.	8 00	4 20
Type DA-31, 0 to 35 lb.	8 50	4 45
Type DA-31, 0 to 60 lb.	8 50	4 45
*Type DA-31, 0 to 100 lb.	9 00	4 60
Type DA-31, 0 to 150 lb.	9 50	4 85
HOT WATER		
Fig. 35 Risertherm (Clamp-On Type), 110 to 200°F.	6 00	2 75
Fig. 34 Risertherm, 140-230°F. (closes on rise in temp.)	6 50	3 00
Type 115W Immersatherm, 50 to 250° (opens on rise in temp.)	6 50	2 75
Type 115W-3 Immersatherm, 50 to 250° (closes on rise in temp.)	6 50	2 75
Type DA-36 Straight Stem Immersion, 110 to 200° or 135 to 235°	10 50	4 75
Type DA-37 Back Angle Stem Immersion, 110 to 200° or 135 to 235°	10 50	4 75
WARM AIR		
Type M-51 Limit Control	7 00	3 25
Type M-53 SW Fan Control with Summer-Switch	7 50	3 40
*Type M-80 or M-80B Combination Fan and Limit Control	11 00	4 75
*Type M-82 or M-82B Combination Fan and Limit Control	12 00	5 10
*Type M-84 or M-84B Combination Fan and Limit Control	12 00	5 10
*Type M-88 or M-88B Combination Fan and Limit Control	12 00	5 10
Type 116 Ductatherm, 50 to 300°	PRICES ON APPLICATION	

*FURNISHED STANDARD WITH BUILT-IN SUMMER SWITCH

CONTROL UNITS AND PRICES (CONT'D.)

LOW WATER CONTROLS	List Price	Net Price
Type DA-131Q Combination Pressure and Low Water, Range 0 to 10 lb., Complete with Quick Hook-Up	$23.00	$11.00
Type 123 Low Water Cut-Out, 30 lb. Max.	14.00	7.00
Type 123 Low Water Cut-Out, 30 lb. Max., Complete with Quick Hook-Up Attachments	17.00	8.50
Type 123 Low Water Cut-Out, 150 lb. Max.	16.00	8.00

OTHER STANDARD OR ODD MODEL CONTROLS AT LIST PRICE LESS 25 25% DISCOUNT.

PRICES RELATING TO ALL CONTROLS ARE FOR STANDARD RANGES AS LISTED IN CATALOG, AND FOR 115 VOLT, 60 CYCLE SPECIFICATIONS ONLY, UNLESS OTHERWISE SPECIFIED.

SPECIAL UNITS AND PRICES

GUARANTEE AND RETURNS

The COMPANY guarantees all control units and equipment manufactured by it and bearing its name or mark to be free from defects in workmanship and material. The COMPANY will, without charge, replace or repair within one year from date of shipment from the COMPANY'S factory any control unit or equipment that may be found to be defective upon inspection at the COMPANY'S factory. This guarantee does not obligate the COMPANY in any manner in cases where control units or equipment have been subjected to careless handling, improper application or faulty installation. In all cases the COMPANY'S liability on the guarantee herein expressed shall be limited to the repair or replacement of the defective control or equipment and in no event shall its liability extend to indirect or consequential damages. The guarantee herein expressed is made in lieu of all other warranties, guaranties, obligations, or liabilities expressed or implied by the COMPANY or its representatives. All statutory or implied warranties, other than of title, are hereby expressly negatived and excluded.

Returns must not be made without the COMPANY'S consent and in all cases the returned controls or equipment must be carefully handled, properly packed and shipped prepaid. If credit is allowed for returns the COMPANY will deduct ten per cent. (10%) to cover handling and inspection charges and a further deduction will be made where recalibrating or refinishing is necessary. Specially made controls may not be returned for credit except at what the COMPANY determines is a fair value for the same.

PATENT WARRANTY

The COMPANY agrees that it will, at its own expense, defend any suit or proceeding that may be instituted against the PURCHASER based upon a claim that any apparatus of the COMPANY'S manufacture furnished by the COMPANY to the PURCHASER constitute an infringement of any Letters Patent of the United States, provided, that the PURCHASER shall not be in default hereunder and shall cause the COMPANY to be promptly notified in writing of such suit and shall give the COMPANY authority to defend such suit through the COMPANY'S counsel and shall furnish to the COMPANY all needed information and assistance for the defense of such suit. The COMPANY will pay all damages and costs awarded against PURCHASER in any suit defended by the COMPANY, provided notice of such suit and authority, information and assistance shall have been given to the COMPANY as aforesaid, and in the event the device or apparatus furnished by the COMPANY, or any part thereof, is held to constitute infringement and its use is enjoined the COMPANY will, at its own expense and at the COMPANY'S option, either: procure for the PURCHASER the right to continue using the infringing devices or apparatus; or replace the same with non-infringing devices or apparatus; or modify the infringing devices or apparatus so that they become non-infringing; or accept the return of the infringing devices or apparatus and refund the purchase price thereof. The foregoing constitutes the COMPANY'S only liability in connection with patent infringement by devices or apparatus furnished by the COMPANY.

Whenever the COMPANY deems it necessary for any reason whatsoever to discontinue the sale of any of the products of the COMPANY, the COMPANY agrees to give written notice to the PURCHASER to discontinue the sale of such products, and the PURCHASER agrees, upon receipt of such notice, to make no further sales or installations of any such products unless or until authorised so to do in writing by the COMPANY.

TERMINATION

In addition to any and all other provisions herein contained relating to termination or cancellation of this agreement, the following circumstances are hereby agreed to be and shall be deemed to be conclusive evidence of the breach of this agreement by either of the parties hereto, and in any of these events the other party hereto may, at its election, without prejudice to any other remedy it may have, terminate all further obligations on the part of such non-defaulting party made and to be performed under this agreement:

(a) The breach of or the failure to comply with any or all of the terms, covenants, conditions and provisions of this agreement, and a continuance of such breach for thirty or more days after receipt by the defaulting party of written notice thereof.

(b) The adjudicated bankruptcy, either voluntary or involuntary or the adjudicated insolvency of either party hereto, or the making of an assignment for the benefit of creditors or the appointment of a trustee or receiver for either of the parties hereto.

(c) The repudiation of this agreement, in whole or in part, by either party hereto.

FIELD SERVICE

The COMPANY will welcome the opportunity of cooperating with the PURCHASER in educating the PURCHASER'S factory personnel in the servicing and the proper installation of the COMPANY'S controls but the COMPANY does not agree or bind itself to render any such service.

The foregoing constitutes the entire agreement between the parties hereto and no change, alteration or modification of this agreement shall be binding unless reduced to writing and signed by the respective parties hereto. The validity, enforceability and interpretation of this agreement shall be determined and governed by the laws of the State of Illinois.

_____ Purchaser

By _____

_____ Title

THE MERCOID CORPORATION

By [signature]

Title

DATE ACCEPTED 3/11/[illegible]

ESTABLISHED 1885

MINNEAPOLIS-HONEYWELL REGULATOR CO.

MINNEAPOLIS, MINN.

Nov. 28, 1932.

Mercoid Corporation,
4201 Belmont Ave.,
Chicago, Ill.

Attention: Mr. L.H. Van Dess.

Gentlemen:-

At a meeting some time ago between Mr. Van Dess, Mr. Reed and myself, it was understood that I was to advise you of certain patents owned or controlled by our company which are being infringed by some of the devices that we understand you are building. Therefore, want to call your attention to these patents and ask that you investigate them and later talk the situation over.

Cyr	1,768,892
Phalen	1,847,033
Phalen	1,847,034
Phalen	1,847,037
	Re.18,361
	1,847,036.

All of the above patents in connection with your various types of Pyratherms.

In connection with bonnet mounted furnace controls:

1,736,129
1,782,530
1,847,033
1,847,037.

In connection with stack mounted stoker controls:

1,736,129
1,847,033.

In connection with your ceramic type switches, we believe certain claims of 1,774,108 would be of interest to you, and you are already familiar with the interference proceedings between Cramblet application v. McCabe patent 1,757,436.

In reference to stoker circuits, you are familiar with the fact that we are the sole licensees of the Cross patents and I will not go into detail on them at this time.

MERCOID EXHIBIT S

MINNEAPOLIS-HONEYWELL REGULATOR CO

Arcold Corporation -2- Nov. 28, 1932.

In reference to your furnace fan circuits, we would call your attention to the Freeman patent No. 1,813,732.

On your type SM Pyratherm, we think you would be interested in studying our patent No. 1,764,344.

In connection with your type SV oil burner control, we very shortly are reissuing our patent No. 1,764,344, which will contain certain new claims which we think will be of interest to you.

In connection with your SM-V Pyratherm, we also want to call your attention to certain of the claims contained in above patent.

In connection with the type 855 room thermostat, certain claims contained in patents Nos. 1,704,370 and 1,736,129, which we believe are infringed.

The same holds true in connection with the #845 room thermostat and the #848 control.

I believe you were going to write me a similar letter after you had studied some of your patents in reference to our devices and will be pleased to have this at your convenience.

Yours very truly,

MINNEAPOLIS-HONEYWELL REGULATOR CO.

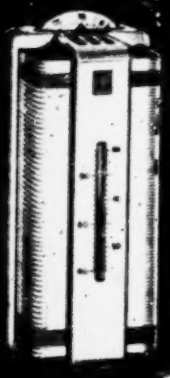
H. W. Sweatt, Vice-Pres. & Gen. Mgr.

HWS:JT

Revised

HONEYWELL

AUTOMATIC CONTROLS



LIST ★ ★ ★ ★

CATALOG

1940

Patent Notice

Minneapolis-Honeywell Controls, Time-O-Stat Controls and Con-Tac-Tor Mercury Switches and National Regulator Controls are manufactured and sold under the following patents either owned by Minneapolis-Honeywell Regulator Company or under which Minneapolis-Honeywell Regulator Company is licensed. Other U.S. and foreign patents are pending.

Re 16,087	1,694,053	1,791,589	1,875,387	1,924,825	2,008,749	2,098,808	2,144,587	2,177,803
Re 16,140	1,694,107	1,792,101	1,875,388	1,925,455	2,008,776	2,099,687	2,145,146	2,178,825
Re 16,444	1,700,316	1,792,230	1,875,509	1,925,781	2,013,286	2,100,264	2,145,199	2,179,044
Re 17,993	1,703,534	1,795,149	1,875,510	1,926,880	2,017,368	2,101,548	2,145,791	2,179,700
Re 18,361	1,703,537	1,795,286	1,875,511	1,927,036	2,019,671	2,101,808	2,146,127	2,180,503
Re 18,503	1,704,008	1,795,511	1,875,589	1,927,846	2,019,948	2,102,324	2,146,604	2,180,675
Re 18,771	1,704,370	1,798,544	1,875,669	1,929,606	2,020,168	2,104,972	2,146,680	2,180,764
Re 19,091	1,704,371	1,800,412	1,876,044	1,931,236	2,021,407	2,105,686	2,146,681	2,180,800
Re 19,235	1,705,527	1,805,277	1,876,136	1,931,663	2,021,413	2,106,898	2,147,274	2,181,081
458,749	1,707,193	1,809,827	1,877,037	1,935,909	2,022,188	2,107,077	2,147,604	2,181,423
460,128	1,707,194	1,810,172	1,877,278	1,937,746	2,023,740	2,108,770	2,148,868	2,181,427
462,049*	1,707,195	1,813,732*	1,877,327	1,937,929	2,023,748	2,108,778	2,149,542	2,183,874
484,156	1,707,459	1,816,881	1,877,606	1,937,966	2,025,097	2,109,082	2,150,117	2,184,613
491,156	1,713,402	1,818,546	1,878,010	1,940,718	2,025,264	2,109,862	2,151,040	2,184,701
493,739	1,713,773	1,818,697	1,879,154	1,941,502	2,025,542	2,109,939	2,151,080	2,184,703
496,596	1,716,775	1,820,300	1,880,524	1,941,540	2,028,110	2,110,049	2,152,843	2,188,438
501,943	1,716,951	1,826,570	1,880,829	1,941,546	2,029,466	2,112,218	2,154,041	2,188,542
533,630	1,725,666	1,826,571	1,880,830	1,942,699	2,029,513	2,112,397	2,154,051	2,188,565
537,921*	1,725,676	1,826,572	1,880,831	1,943,988	2,029,615	2,114,704	2,154,511	2,188,635
543,418	1,727,308	1,826,983	1,880,832	1,946,598	2,032,656	2,114,961	2,154,523	2,188,775
543,445	1,727,735	1,827,071	1,880,871	1,948,903	2,036,866	2,114,965	2,154,644	2,188,806
544,342	1,730,828	1,827,072	1,881,537	1,949,310	2,037,911	2,116,606	2,154,858	2,188,865
558,277	1,730,829	1,827,340	1,881,964	1,961,563	2,038,087	2,116,801	2,155,358	2,188,877
559,186	1,730,830	1,828,553	1,882,341	1,963,425	2,039,910	2,116,802	2,155,964	
567,435	1,730,831*	1,831,848	1,883,015	1,966,753	2,041,080	2,117,021	2,157,329	Des. 85,552
569,474	1,732,174	1,832,482	1,883,146	1,967,035	2,041,383	2,117,514	2,158,069	Des. 86,681
571,401	1,734,017	1,835,307	1,883,240	1,968,081	2,041,845	2,117,768	2,159,284	Des. 96,822
572,495	1,736,129	1,835,974	1,883,241	1,968,093	2,041,821	2,118,866	2,159,503	
583,586	1,736,141	1,838,152	1,883,242	1,980,589	2,045,790	2,119,503	2,159,513	
585,629	1,738,190	1,839,630	1,883,243	1,981,252	2,048,162	2,119,944	2,159,617	
593,581	1,739,318	1,843,601	1,883,244	1,981,778	2,048,653	2,120,427	2,159,624	
598,874	1,744,189	1,844,936	1,883,245	1,981,802	2,052,536	2,120,803	2,159,951	
598,875	1,745,178	1,845,227	1,883,246	1,982,506	2,052,537	2,120,937	2,160,600	
598,876	1,745,640	1,847,033	1,883,247	1,982,520	2,052,918	2,120,938	2,160,042	
598,877	1,747,153	1,847,034	1,883,248	1,983,957	2,052,929	2,121,321	2,160,400	
599,173	1,749,826	1,847,038	1,883,987	1,986,108	2,052,947	2,122,887	2,161,248	Canadian Patents
605,299	1,751,544	1,847,036	1,886,439	1,988,385	2,052,987	2,123,428	2,161,258	No. 238,347 (1924)
607,392	1,752,149	1,847,037	1,893,238	1,989,136	2,054,331	2,123,283	2,161,892	248,704 (1925)
609,432	1,752,840	1,847,038	1,893,875	1,989,961	2,054,344	2,125,846	2,162,137	255,926 (1925)
614,563	1,756,146*	1,848,980	1,899,244	1,989,967	2,055,033	2,126,182	2,166,902	285,315 (1928)
620,806	1,756,147*	1,848,087	1,899,744	1,989,968	2,059,635	2,126,384	2,167,227	292,948 (1929)
622,112	1,760,382	1,848,683	1,901,070	1,989,974	2,063,808	2,126,914	2,169,141	297,015 (1930)
625,796	1,763,093	1,850,448	1,902,173	1,970,987	2,064,193	2,127,472	2,169,166	305,083 (1930)
627,690	1,763,094	1,852,333	1,902,481	1,970,998	2,064,194	2,127,880	2,169,346	305,601 (1930)
631,404	1,764,346	1,853,194	1,902,482	1,972,291	2,064,231	2,129,472	2,170,072	324,363 (1932)
650,993	1,765,086	1,853,198	1,903,414	1,973,620	2,065,835	2,132,292	2,170,232	324,384 (1932)
651,629	1,765,297	1,853,198	1,905,721	1,974,980	2,068,841	2,132,322	2,170,310	324,385 (1932)
651,630	1,768,805	1,853,431	1,907,093	1,974,985	2,068,844	2,132,813	2,170,386	330,554 (1933)
652,524	1,768,892	1,854,207	1,908,009	1,978,705	2,068,413	2,134,940	2,170,497	333,959 (1933)
654,398	1,768,940	1,854,519	1,908,493	1,978,737	2,070,118	2,135,991	2,171,272	336,199 (1933)
654,840	1,768,941	1,864,560	1,908,494	1,979,690	2,072,025	2,136,336	2,171,273	336,160 (1933)
664,325	1,768,943	1,868,418	1,908,498	1,985,215	2,073,328	2,138,698	2,172,440	353,990 (1935)
665,801	1,768,949	1,868,741	1,910,721	1,988,218	2,073,346	2,137,550	2,172,487	354,695 (1935)
671,910	1,770,479	1,868,977	1,911,773	1,988,597	2,075,289	2,138,483	2,172,820	357,965 (1936)
673,057	1,773,817	1,868,988	1,912,761	1,988,809	2,076,518	2,138,780	2,173,331	361,552 (1936)
673,963	1,774,108	1,869,934	1,914,438	1,988,877	2,078,768	2,138,791	2,173,798	363,994 (1937)
675,131	1,774,109	1,881,046	1,916,814	1,989,278	2,080,718	2,138,792	2,173,799	364,824 (1937)
676,920	1,774,275	1,882,373	1,918,778	1,989,972	2,080,836	2,138,796	2,173,801	536,420 (1937)
676,922	1,779,143	1,883,389	1,918,794	1,990,218	2,081,091	2,140,451	2,173,809	366,421 (1937)
676,923	1,780,302	1,883,394	1,918,806	1,990,813	2,083,532	2,140,473	2,173,810	369,978 (1937)
678,202	1,780,312	1,888,841	1,919,337	1,991,591	2,083,613	2,140,486	2,174,910	370,112 (1937)
680,049	1,780,315	1,871,071	1,920,787	1,991,807	2,083,780	2,141,208	2,174,443	376,095 (1938)
680,263	1,780,980	1,872,147	1,920,988	1,993,262	2,086,037	2,141,244	2,175,720	376,096 (1938)
680,348	1,782,530	1,872,223	1,921,196	1,993,687	2,089,181	2,142,059	2,175,721	376,442 (1938)
683,408	1,783,474	1,872,880	1,922,201	1,997,599	2,089,826	2,143,076	2,176,009	376,754 (1938)
685,286	1,783,730	1,874,116	1,923,254	1,999,063	2,093,649	2,143,351	2,177,496	381,293 (1939)
688,121	1,785,741*	1,874,117	1,924,304	2,000,700	2,094,932	2,143,356	2,177,596	384,010 (1939)
690,881	1,787,700	1,874,811	1,924,908	2,003,824	2,096,323	2,143,589	2,177,597	388,107 (1939)

*The right to use the Systems protected by the following patents is only granted to the user by Minneapolis-Honeywell Regulator Company when the particular controls as shown below are purchased from Minneapolis-Honeywell Regulator Company and used in the Systems:

Patent No.	SYSTEM	CONTROLS
1,467,049	Diaphragm Gas Valve System	Any Main Fuel Valve or Safety Pilot
1,758,146	System of maintaining Stoker Fire	▲Stokerswitches
1,758,147	System of maintaining Stoker Fire	▲Holdfire Controls
1,785,741	Humidifying System	Humidity Responsive Controls
1,813,732	Forced Air Furnace Control System	Furnace Fan Controls

▲Trade Mark

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

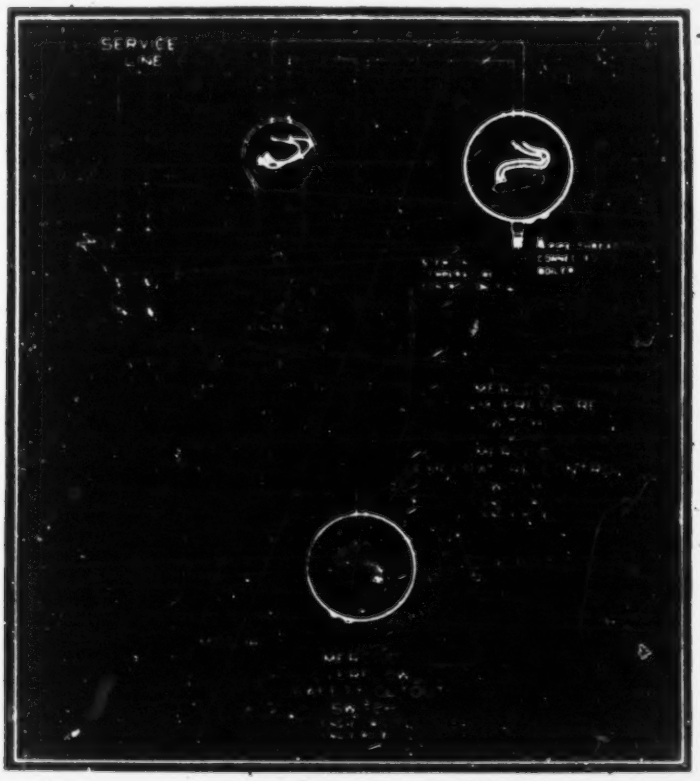
BULLETIN D

FEDERAL
MERCOID CONTROLS

Data Sheet No. 1 — April 1, 1924

The accompanying diagrams illustrate a few of the many applications of the Mercoid Controls for temperature, pressure, etc., and show correct wiring diagrams. Mercoid Controls can be used for almost any work where it is desired to make and break an electric circuit according to temperature or pressure changes. Details of construction and operation of the Mercoid Thermostat are furnished in a special circular sent upon request.

Write us for additional information on Controls for special requirements, giving details of the the proposed application and statement of the work desired to be accomplished.



Typical Wiring Layout on Oil Burner

PATENTS PENDING

MERCOID EXHIBIT II

MERCOID BULLETIN **E**

MERCOID SWITCH
FEDERAL
WARRANTED
CHICAGO MARSHALLTOWN

JUNE 1924

FEDERAL MERCOID THERMOSTATS

Designed Especially for Automatic Heating Equipment

Contact is made within the Federal Mercoid sealed glass tube, containing inert gases and mercury.

Has no exposed conducting surfaces, eliminating corrosion, oxidation and open arc.

Federal Mercoid Tube is actuated by a sealed metal bellows, containing expansive liquids or gases.

Accurate and positive in operation.

Protected by brass cover having hard rubber finish.

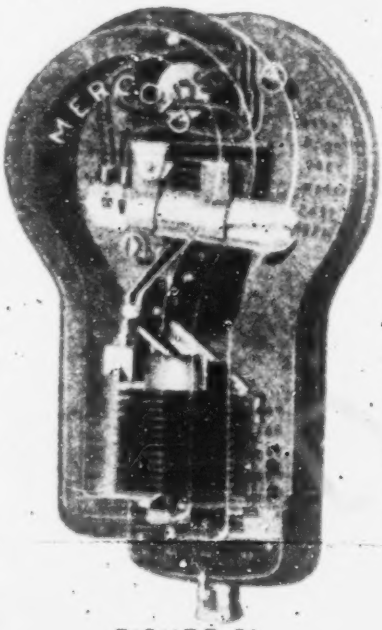


FIGURE 21

FEDERAL MERCOID THERMOSTATS will automatically control Motors of one horsepower or less, within guaranteed ratings, for normal working load of 10 amperes at 110 volts or 5 amperes at 220 volts (or their equivalents), *either A. C. or D. C.*, thereby eliminating the use of relays or remote controls. As a pilot switch, may be used to control any size motor.

Regularly furnished with standard scale 55° to 80° F., with a guaranteed operating differential of 2°.

Adjustable to open and close the circuit at any point within its range

List Prices for Standard Range Thermostats:

	Figure 21
Single Pole Type	$40.00 each
Two-circuit " (3-wire, or single pole and alarm)	45.40 "
Single Pole and Momentary Contact Type	45.40 "
Two-pole Type	50.00 "
For Ranges Other Than Standard add to above lists	10.00 each

THE FEDERAL GAUGE COMPANY
564 WEST ADAMS STREET
CHICAGO, ILL., U. S. A.

PATENTS PENDING

FEDERAL MERCOID BOILER CONTROLS

Pressure Type

As safety limiting devices, Federal Mercoid Boiler Controls are positive, accurate and reliable.

May be used for circuit breaker on motors of one horsepower or less.

Regularly furnished with ¼" male bottom connection.



FIGURE 31

Steam Switches must be siphoned (use an ordinary pig-tail or any other efficient siphon).

Furnished with semi-glass front and steel ring, or all metal cover.

BX or conduit connection furnished where specified.

Standard operating differential of 3 lbs. on pressures up to 10 lbs. and adjustable. Closer ranges where required. Pressures from 10 lbs. to 20 lbs. require a 5-lb. minimum operating differential, and pressures from 40 lbs. to 100 lbs. require a 10-lb. operating differential. Furnished for other pressures up to 400 lbs., requiring approximately 15% to 20% operating differential.

IMMERSION TYPE BOILER CONTROLS

Straight Stem Temperature Type



FIGURE 36

½" male conn. and 6" stem
or
½" male conn. and 4" stem

Standard Range, 140° to 180° F., adjustable up to 185° to 205° F. For lower temperature work the standard range is 140° to 160° F. adjustable up to 165° to 180° F. For Vapor or Steam Boiler Control the standard range is 200° to 214° F., adjustable up to 214° to 226° F.

Federal Mercoid Boiler Controls have a set operating differential but the high and low points may be changed by means of a small hex. nut on back of control.

Back Angle Stem Temperature Type

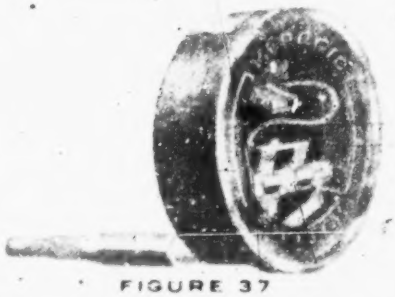


FIGURE 37

¼" male conn. and 6" stem
or
½" male conn. and 4" stem

For List Prices on Above See Page Three of This Bulletin

*PATENTS PENDING

MERCOID LEVER ARM TYPE CONTROLS

Counterbalanced Type

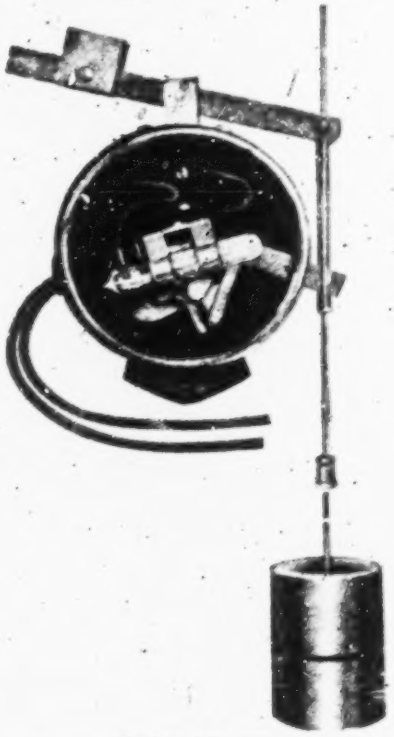


FIGURE 40

For Maintaining fluid levels

Lever Arm Overflow Type

(Top or Bottom Mounting)



FIGURE 46

For final safety on overflow also on Vapor Heating Systems, close regulations may be obtained with this type of control when used in connection with chain and weights on lever arm of Boiler Regulator

Made to open or close circuit, with lever arm in up or down position.

Lever Arm Type, Figure 46, may be used as a sump switch or in connection with a cellar drainer. Positive, accurate and reliable, will automatically control directly, motors of one-horse-power or less, within guaranteed rating, for normal working load of 10 amperes at 110 volts or 5 amperes at 220 volts (or their equivalents), *either A. C. or D. C.*, thereby eliminating the use of relays or remote controls. As a pilot switch may be used to control any size motor.

List Prices

	Fig. 41 Each	Fig. 45 Each	Fig. 37 Each	Fig. 40 Each	Fig. 46 Each
Single Pole Type	$27.00	$30.00	$32.00	$22.00	$17.00
Two-circuit (3-wire or S. P. and alarm)	33.00	36.00	38.00	28.00	23.00
Single Pole and Momentary Contact	33.00	36.00	38.00	28.00	23.00
Two-Pole Type	37.00	40.00	42.00	32.00	27.00
For Ranges other than Standard add	5.00	10.00	10.00		

PATENTS PENDING

MERCOID SWITCH
FEDERAL
WARRANTED
CHICAGO MARSHALLTOWN
TRADE MARK

FEDERAL MERCOID FURNACE CONTROL

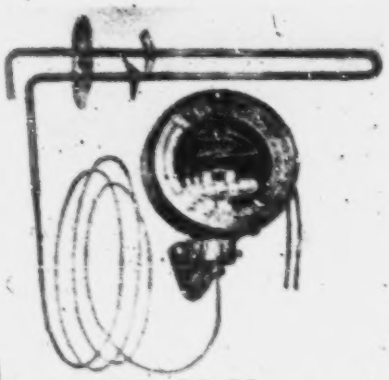


FIGURE 80

For automatic control on warm air furnaces.

Acts as safety device to prevent overheating of furnace.

Standard Range 250° to 300° F. Range may be adjusted by sliding loaded stem in or out of furnace dome, or by standard adjustment on back.

Furnished with bronze stem, charged with an expansive liquid, operating on the same principle as the Federal Mercoid Hot Water Boiler Control.

Equipped with bracket for wall fastening.

The Federal Mercoid Furnace Control has the same electrical rating as other Mercoid instruments, making relays unnecessary for currents up to 10 amperes at 110 volts or its equivalents.

List Prices

	Each
Single Pole	$40.00
Two-circuit (3-wire or single pole and alarm)	46.00
Single Pole and Momentary Contact	46.00
Two-pole	50.00

FEDERAL MERCOID SWITCHES

Types illustrated below are furnished for other than Pressure, Vacuum or Thermostatic purposes

Two Circuit

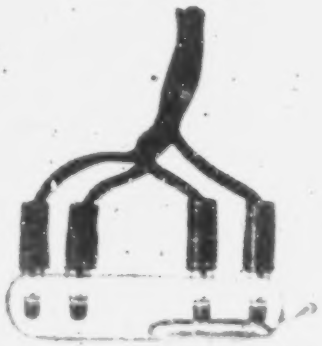


FIGURE 2

Single Circuit

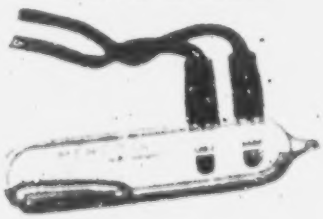


FIGURE 3

Relay Type



FIGURE 4

LIST PRICES

Figure 2	$8.70 each
Figure 3	6.35 each
Figure 4	3.75 each

PATENTS PENDING

ANNOUNCEMENT

THIS catalog is issued in the new name of The Mercoid Corporation. The change is made to conveniently provide for the continual growth taking place in this organization. The founders of The Federal Gauge Company, (which is still the parent Company) have also recently secured the controlling interest in the Arcless Contact Company. There is no change in the entire personnel of the Company. The additional facilities and advantages will afford greater service to old and new customers.

Address correspondence to The Mercoid Corporation,
General Offices 564 West Adams Street, Chicago, Ill.

MERCOID System of DIRECT CONTROL

Catalog
Number
"H" - 3
1928

COMPLETE AUTOMATIC CONTROLS for HEATING EQUIPMENT

THE MERCOID CORPORATION
564 WEST ADAMS STREET
Chicago, Illinois, U.S.A.

25 CHURCH STREET
New York, N. Y.

THE MONADNOCK,
San Francisco, Calif.

Cable Address "MERCOID" Chicago

MERCOID EXHIBIT X

MERCOID System of DIRECT CONTROL

THE MERCOID CORPORATION

The Mercoid Risertherm

Surface Type Control with Mercoid Thermal Element

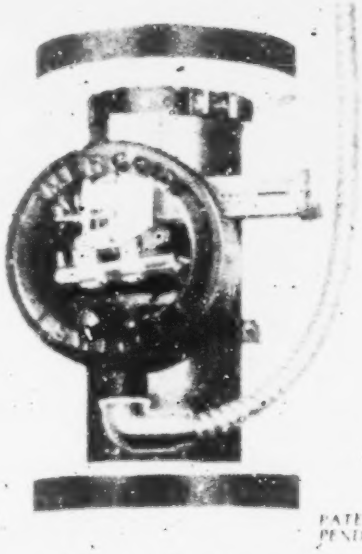


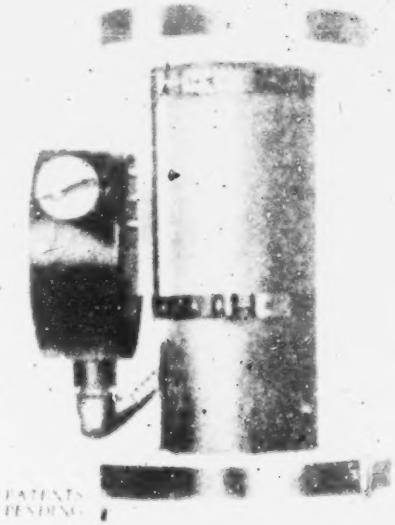
Figure 35 Risertherm mounted on vertical pipe.

Simple to install.

External temperature adjustment
One type fits either horizontal or vertical pipe

Clamp feature locks instrument securely in place.

Fits any pipe or hot water tank
Positive Snap Action



Side view of Risertherm mounted on vertical pipe

MERCOID FIGURE 35 RISERTHERM

THE Risertherm is designed to be clamped on the risers of hot water heating systems, or the surfaces of hot water tanks or pipes to regulate the temperature within. It has many advantageous features not found in any other instrument of this type.

This type of control will not give the same coordinate performance under all weather conditions as does the immersion type (see pages 849). However, its special features insure more positive and accurate performance under all conditions than is to be expected generally in limiting devices of the surface type.

Simplicity of installation and adjustment are among its outstanding features.

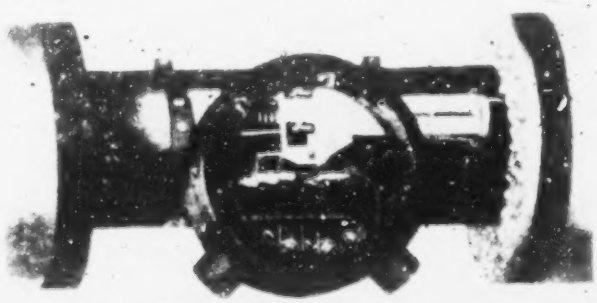


Figure 35L Risertherm mounted on horizontal pipe.

MERCOID FIGURE 35L RISERTHERM

Identical in type and design with Figure 35, except for the two-circuit arrangement, for 3-wire or low voltage requirements. Made with special terminal block clearly marked for such installations.

Standard range is between 110° F. and 210° F. A special range from 140° F. to 230° F. is available when specified. The operating differential of both ranges is approximately 10° F. to 30° F. according to the size of pipe and the conditions of the installation. Additional adjustment is provided within the case to increase the differential where desirable.

The clamping feature of the Risertherm is adjustable to any size pipe and it may be applied to the surface of large diameter tanks by the use of extra length strips. Five feet of perforated strip is regularly supplied which is cut to the necessary length by the installer.

Particular attention is called to the fact that the locking feature of the clamp is designed to maintain accurate and secure location of the instrument. The control cannot be moved without also moving the entire clamp. When the clamp is tightened, it is practically impossible to move the instrument around on the pipe. This prevents accidental disarrangement which might interfere with proper operation in service. Changing the vertical position of the Risertherm does not change the cut-in or cut-out points. This is a distinctive feature of all Mercoid Controls.

THE MERCOID CORPORATION

Mercoid Combination Controls

For Low Water and Pressure

TYPES AVAILABLE UP TO 300 LBS.

PATENTS ISSUED

[illegible] OTHERS PENDING

THE Mercoid Low Water and Pressure Control is designed, primarily, for the protection of automatically fired steam boilers, but has various other fields of application. Boilers to which fuel is supplied continuously offer the hazard of firing into dry boilers or building up excess pressure, against which this instrument is designed to guard.

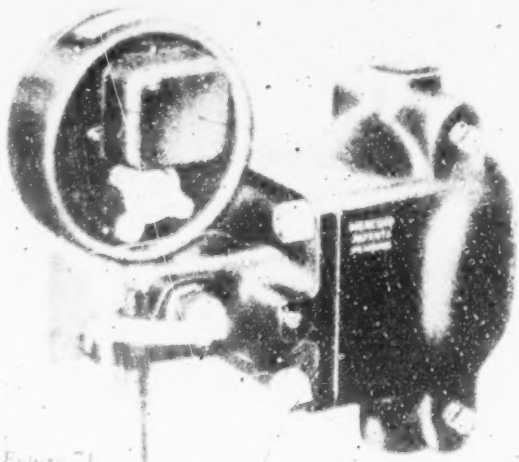


Figure 71

MERCOID FIGURE 71

For Complete Protection

For use on boilers for pressures, as specified, up to 300 lbs. Arranged to break burner motor circuit when water level falls or when steam pressure rises to a predetermined point. Regularly supplied fully automatic, but is made semi-automatic with manual reset where so specified.

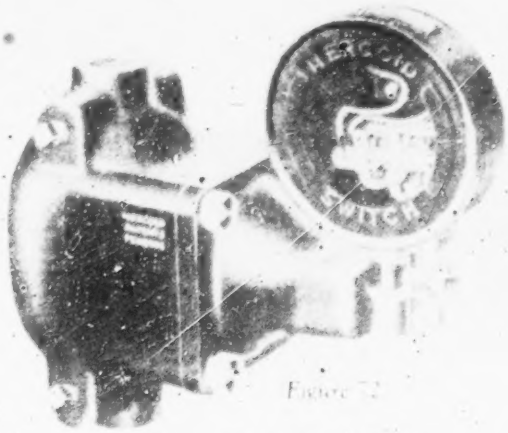


Figure 72

MERCOID FIGURE 72

Low Water Control

Mercoid low water control only, for use on boilers for pressures, as specified, up to 300 lbs. Regularly supplied fully automatic, but is made semi-automatic, with manual reset where so specified.

Where used for control of motor driven feed pump, may be arranged to close circuit at low water level.

Available for pressures above 300 lbs. at special prices.

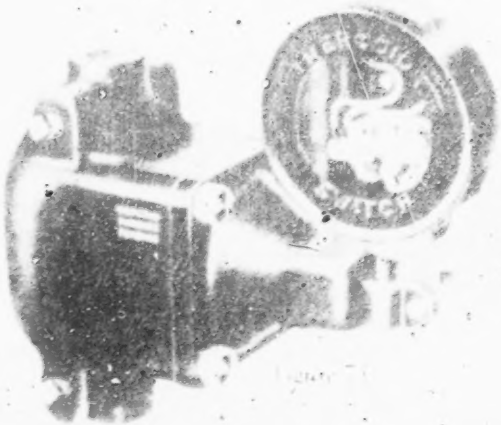


Figure 73

MERCOID FIGURE 73

For Vapor or Vapor Vacuum

The Figure 73 control has been designed for use where diaphragm regulators are available on the boiler, also for vapor or vapor vacuum systems having standard equipment floats or diaphragms. This unit may be attached on such installations and positive operation assured, especially where very close pressure regulation is essential.

MERCOID System of DIRECT CONTROL

Mercoid Furnace Controls

For Warm Air Furnaces

A POSITIVE SAFETY DEVICE TO PREVENT OVERHEATING

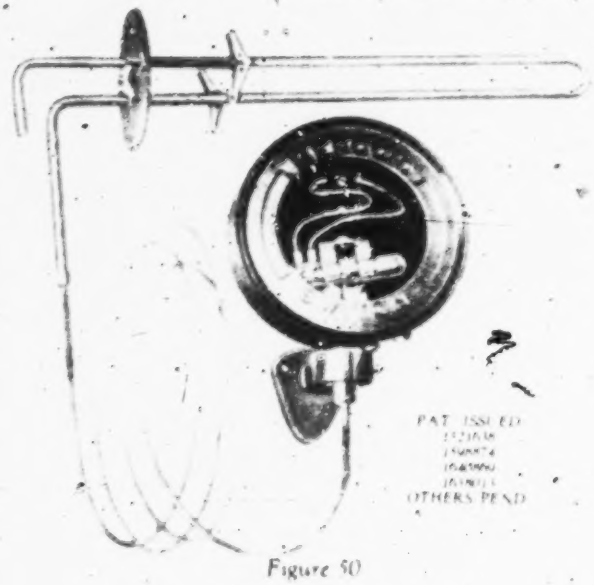


Figure 50

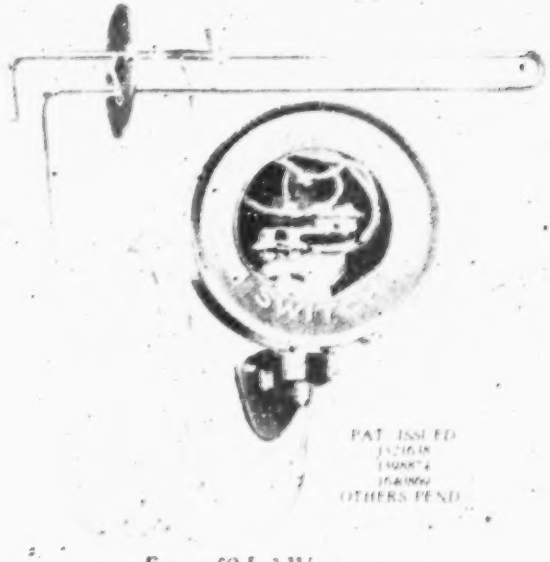


Figure 50-L 3-Wire

FIGURE 50

Will handle currents up to 10 amperes at 110 volts or 5 amperes at 220 volts, A. C. or D. C.

FIGURE 50-A

Equipped with Fig. 17 Mercoid Tube. For applications where the current requirements do not exceed 3 amperes at 110 volts, A.C. or D.C.

FIGURE 50-L (3 Wire)

Designed for 3-Wire or low voltage installations. Furnished with one each, red, white and blue binding posts. Will handle currents not in excess of 1 ampere at 110 volts, A. C. or D. C.

THE instruments shown above are designed for operation on warm air furnaces that are equipped with motor-driven units. The bronze remote stem, which is charged with an expansive liquid, is intended for installation in the furnace hood above the dome, while the instrument proper may be mounted conveniently on a wall, by means of the bracket provided therefor, as shown in the illustration. When so installed this control operates as a positive safety device to prevent over heating. Standard range 250° F. to 300° F., opening the electric circuit at the high point and restoring it on a 50° drop in the temperature in the furnace dome. The range may be adjusted by simply sliding the stem in or out of the furnace hood, also by the standard adjustment on the back of the case. Regularly furnished fully automatic or semi-automatic when specified.

Orders should specify whether circuit is to close on rise or fall in temperature.

Furnace Fan Control for automatic control of booster fans on warm-air furnaces.

Standard range is 190° F. to 140° F., cutting in at high point to start the fan motor and cutting out when the dome temperature drops to the low point.

LIST PRICES

Fig. 50, $27.00	Fig. 50A, $24.00	Fig. 50L, $27.00
For 2 Pole add to list		6.00

Shipping Weight 6 lbs. 11 oz.

TYPICAL MERCOID WIRING DIAGRAMS

THE simplicity of the Mercoid system of 2-wire direct control is fully recognized. There are no confusing or intricate wiring installations to be made. The hazards and expense of improper hookup are avoided.



The hookups shown above are typical of the usual oil burner installations in connection with the Pyratherm Type SA.



AUTOMATIC CONTROLS FOR DOMESTIC AND INDUSTRIAL HEATING EQUIPMENT

MERCOID



CATALOG
No H5
1 9 2 9

REVISED EDITION

Combined Industries
The Federal Gauge Company
Arcless Contact Company

THE MERCOID CORPORATION
564 WEST ADAMS STREET
Chicago, Illinois, U.S.A.

25 CHURCH STREET
New York, N. Y.

1129 FOLSOM STREET
San Francisco, Calif.

Cable Address "MERCOID" Chicago

MERCOID EXHIBIT Y

The Mercoid Pressure Control

For Steam Boilers (Cont'd)



Figure 31-L

FIGURE 31-L

For 3-wire or Low voltage

Designed for 3-wire or low voltage requirements, with one each, red, white and blue binding posts, will handle currents not in excess of 1 ampere at 110 volts, A. C. or D. C.

For automatic oil burner installations requiring a 3-wire or low voltage hookup.

ADJUSTMENTS

All types have a simple adjustment for raising or lowering the cut-in and cut-out points.

1. *Improved type outlet box with outside screws, for making quick electrical connections. (Not used on low voltage types.)*
2. *Knurled hand reset button on both fully automatic and semi-automatic types of instruments.*
3. *Hand adjustment for raising or lowering the boiler control setting.*



Figure 31

Standard range 1 to 4 lbs. adjustable 7 to 10 lbs.

Available ranges other than standard:

Setting	Adjustable
0 to 2 lbs.	1 to 3 lbs.
½ to 3 lbs.	2 to 4½ lbs.
5 to 8 lbs.	9 to 12 lbs.
5 to 10 lbs.	10 to 15 lbs.

Where furnished for pressures above 15 lbs. and up to 25 lbs. the minimum operating differential is 5 lbs. Pressures above 25 lbs. and not exceeding 90 lbs. require a minimum operating differential of 10 lbs.

For pressures from 90 lbs. to 150 lbs. an operating differential of from 15 lbs. to 20 lbs. is the minimum.

Pressures from 150 lbs. to 300 lbs. require a 25 lb. to 30 lb. minimum operating differential. Higher pressures available.

LIST PRICES

	Minimum Operating Pressure (0 lbs. to 15 lbs.)	Maximum Operating Pressure (0 lbs. to 30 lbs.)	Maximum Operating Pressure (0 lbs. to 90 lbs.)	Maximum Operating Pressure (90 lbs. to 300 lbs.)
Figure 31 — Single Pole	$20.00	$22.00	$24.00	$30.00
Figure 31-A Single Pole	17.00	19.00	21.00	27.00
Figure 31-L (3-wire)	20.00	22.00	24.00	30.00
Figure 31 — Two Pole (or two circuit)	26.00	28.00	30.00	36.00

Double Adjustment Type shown on page 20.

Case diameter 5¼", height overall, 7¾", depth 3¼" with outlet box.

Shipping Weight 4 lbs. 14 oz.

MERCOID System of DIRECT CONTROL

THE MERCOID CORPORATION

The Mercoid Risertherm

Surface Type Control with Mercoid Thermal Element

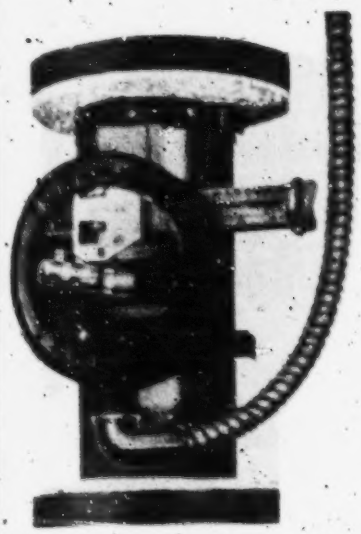


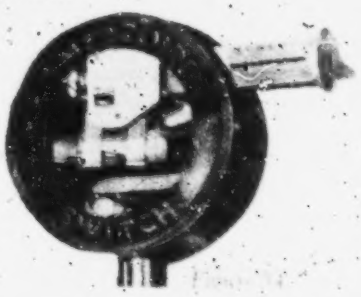
Figure 35 Risertherm mounted on vertical pipe.

Simple to install.

External temperature adjustment. The same type fits either horizontal or vertical pipe.

Clamp feature locks instrument securely in place.

Fits any pipe or hot water tank. Positive Snap Action.



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1598874
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OTHERS PEND

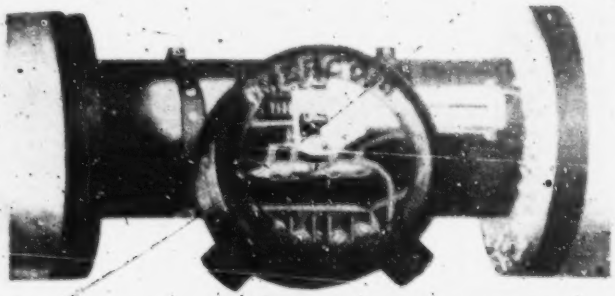


Figure 35L Risertherm mounted on horizontal pipe.

THE Risertherm is a temperature limiting device designed to be clamped on the risers of hot water heating systems or the surface of hot water tanks or pipes to regulate the temperature within.

Simplicity of installation and ease of adjustment are outstanding features of the Risertherm.

The same instrument may be quickly installed in either a vertical or horizontal position. This feature is a convenience to the installer and economizes on stock.

The Risertherm is sturdy in construction and built for enduring service. Every precaution has been taken to insure safe and dependable performance. If the thermal element should be removed or injured in any way, the circuit will automatically open and stop the equipment.

The clamping arrangement, properly installed, securely holds the instrument in a permanent position, removes the danger of slipping on the pipe or tank and prevents accidental disarrangement.

For vapor-vacuum heating systems, Fig. 37 is recommended, instead of the Risertherm. See page 8.

FIGURE 34
For Dual Control of Unit Heaters

This instrument is designed to close the circuit when the temperature rises to a predetermined point, opening the circuit when the temperature falls. Used in connection with a thermostat for dual control of unit heaters to prevent operation of the fan until the coils are heated, insuring economical operation.

FIGURE 35

This instrument is designed to open the circuit when the temperature rises to a predetermined point, closing the circuit when the temperature drops. Used as a limiting device in connection with automatic hot water heating equipment.

Figs. 34 and 35 instruments are regularly supplied with Fig. 3 tube, handling currents up to 10 Amp. at 110 Volts and 5 Amp. at 220 Volts, A. C. or D. C.

Figs. 34-A and 35-A are identical in design with Figs. 34 and 35 respectively, except that they are regularly supplied with Fig. 17 tube for handling currents up to 3 Amp. at 110 V. and 1½ Amp. at 220 Volts, A. C. or D. C.

Figs. 34-L and 35-L are also identical with Figs. 34 and 35 respectively, except that they are supplied with two circuit arrangement for 3-wire or low voltage requirements. Made with special terminal block clearly marked for such installations.

STANDARD RANGE

Standard range: 110° F. to 200° F. A special range, 140° F. to 230° F. is available for unit heater application. The operating differential of both ranges is approximately 6° F. to 24° F. according to the size of pipe and the conditions of the installation.

MERCOID System of DIRECT CONTROL

THE MERCOID CORPORATION

Mercoid Furnace Controls

A New Design in Furnace Controls Employing a Thermostatic Metal Coil

For Warm Air Furnaces and Booster Fans

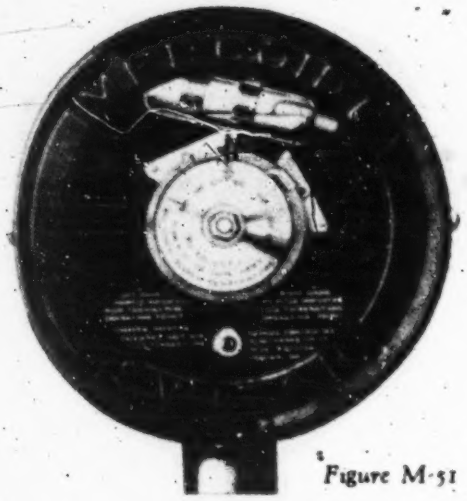


Figure M-51

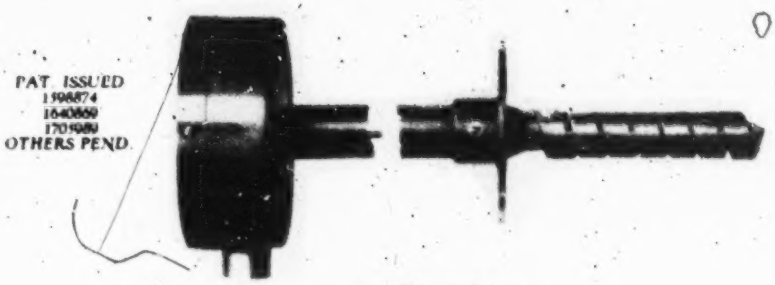


Figure M-51
Showing side view of instrument

This control is used to prevent the overheating of warm air furnaces. Used also for booster fan control, to turn on fan when the furnace temperature has reached a predetermined degree shut off when the furnace has cooled to a predetermined temperature. This instrument has some exclusive features. It indicates the temperature in the furnace duct so that one may see at a glance what heat the furnace is generating. This information is useful in determining the amount of heat required for any desired conditions.

The case has a glass front, permitting the temperature dial to be plainly visible.

An adjustable differential is provided.

This control is easy to install, accurate and positive in its operation, and will give long and reliable service.

When ordering specify if it is to be used as a safety furnace control or for booster fan application. The same control can be used for either purpose by simply reversing the Mercoid tube. For furnace control, the mercury switch is placed so that the contacts or electrodes in the switch are to the left side, while for booster fan installation the Mercoid switch is placed with the electrodes to the right side.

The switch tube is shellaced to the clamp at the factory, and if an outside change is made it should again be shellaced so that it will remain in a fixed position.

No relay or starting switch is necessary where the normal working loads do not exceed 10 amperes at 110 volts or 5 amperes at 220 volts A. C. or D. C.

Dimensions: 16½" long over all, diameter of case, 4¾". Shipping weight 4 lbs., 7 oz.

Standard Range: 50 to 600° F.

LIST PRICES

Figure M-51 furnace control single pole	$18.00
Figure M-51 furnace control two pole or two circuit add to list	6.00

MERCOID SYSTEM OF DIRECT CONTROL

THE MERCOID CORPORATION

Mercoid Furnace Controls

For Warm Air Furnaces

A POSITIVE SAFETY DEVICE TO PREVENT OVERHEATING

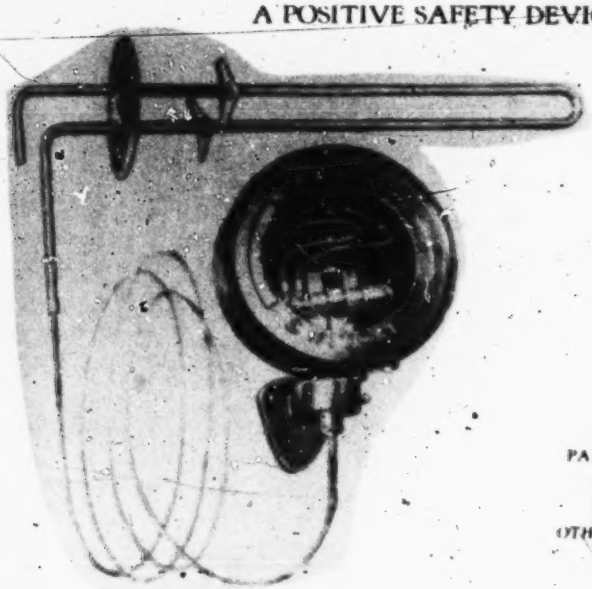


Figure 50

PAT. ISSUED
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OTHERS PEND.

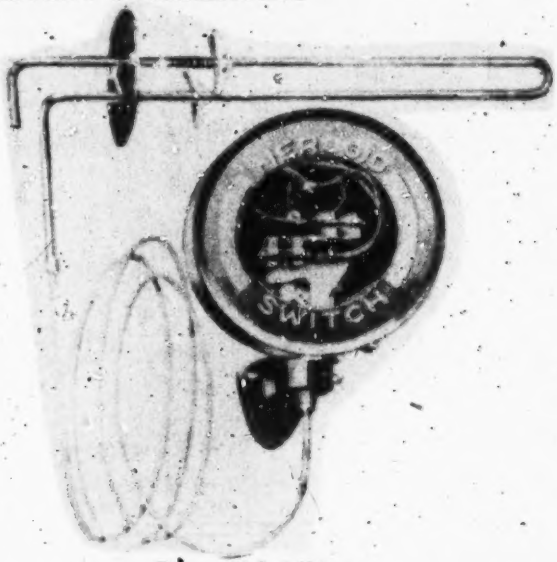


Figure 50-L 3-Wire

FIGURE 50

Will handle currents up to 10 amperes at 110 volts or 5 amperes at 220 volts, A. C. or D. C.

FIGURE 50-A

Equipped with Fig. 17 Mercoid Tube. For applications where the current requirements do not exceed 3 amperes at 110 volts, A.C. or D.C.

FIGURE 50-L (3 Wire)

Designed for 3-Wire or low voltage installations Furnished with one each, red, white and blue binding posts. Will handle currents not in excess of 1 ampere at 110 volts, A..C. or D. C.

THE instruments shown above are designed for operation on warm air furnaces. The bronze remote stem, charged with an expansive liquid, is intended for installation in the furnace hood above the dome, while the instrument proper may be mounted conveniently on a wall, by means of the bracket provided therefor, as shown in the illustration. Where so installed this control operates as a positive safety device to prevent over-heating. Standard range 250° F. to 300° F., opening the electric circuit at the high point and restoring it on a 50° drop in temperature in the furnace dome. The range may be adjusted by simply sliding the stem in or out of the furnace hood, also by the standard adjustment on the back of the case. Regularly furnished fully automatic; may be furnished semi-automatic, with hand reset, where specified.

Orders should specify whether circuit is to close on rise or fall in temperature.

As a furnace fan control, for automatic control of booster fans on warm air furnaces, the standard range is 190° F. to 140° F., cutting in at high point to start the fan motor and cutting out when the dome temperature drops to the low point.

LIST PRICES:

Fig. 50, $27.00 Fig. 50A, $24.00 Fig. 50L, $27.00

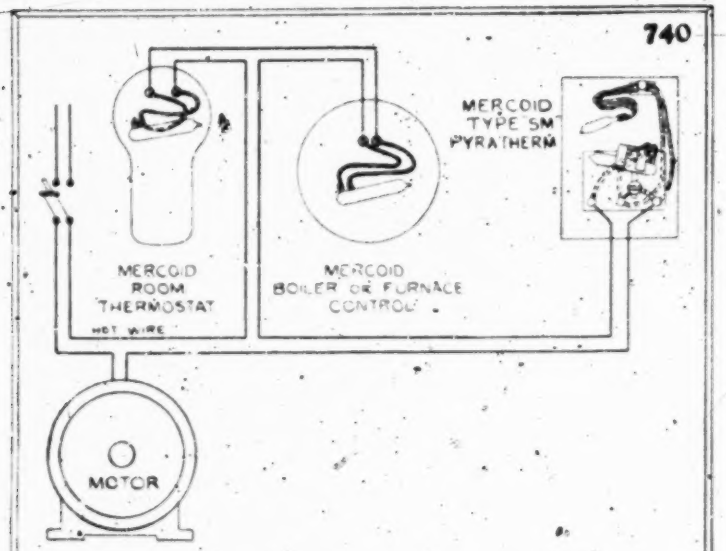
For 2 Pole or two circuit add to list 6.00

Shipping Weight 6 lbs. 11 oz.

TYPICAL MERCOID WIRING DIAGRAMS

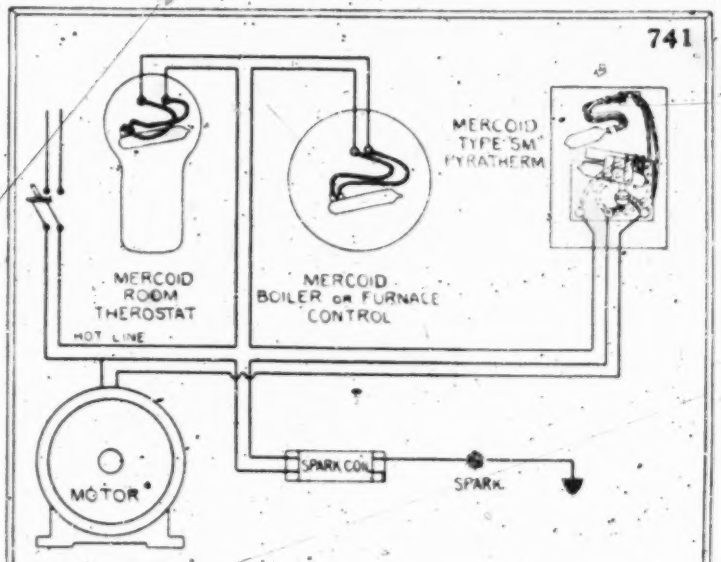
THE simplicity of the Mercoid system of 2-wire direct control is fully recognized. There are no confusing or intricate wiring installations to be made. The hazards and expense of improper hookup are avoided.

740



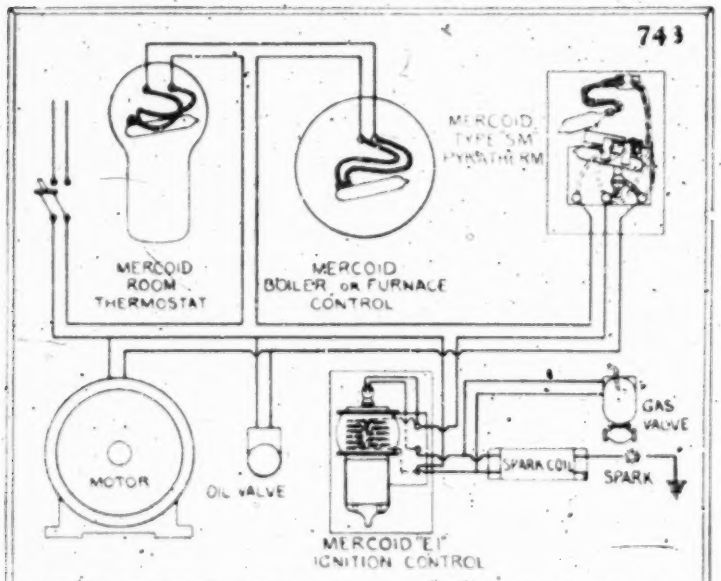
WIRING OF "SM" PYRATHERM

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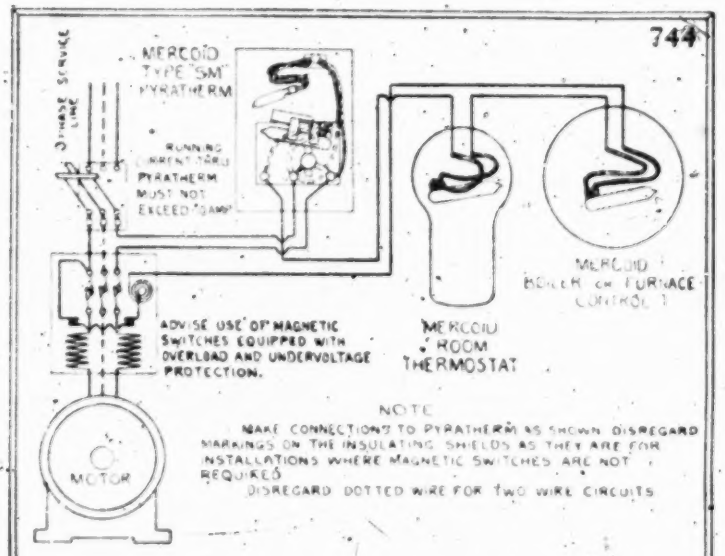
WIRING OF SM PYRATHERM WITH CONTINUOUS IGNITION

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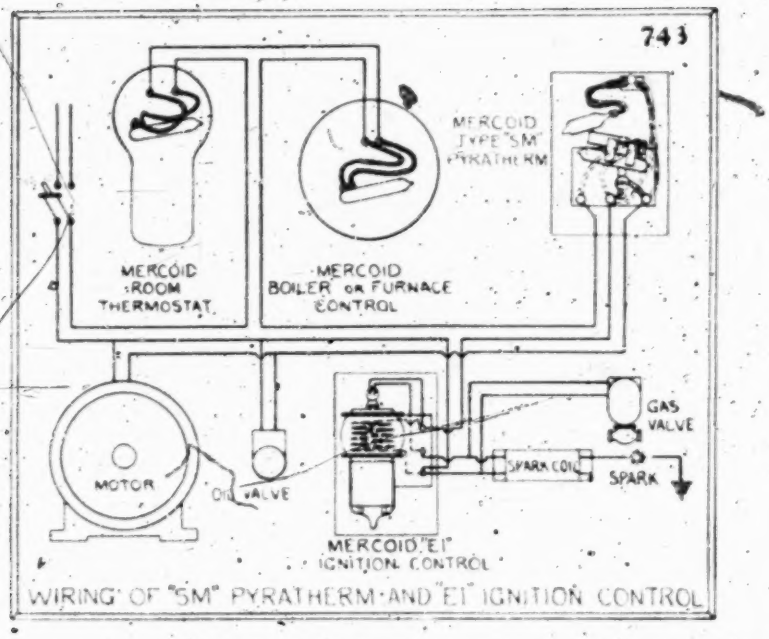


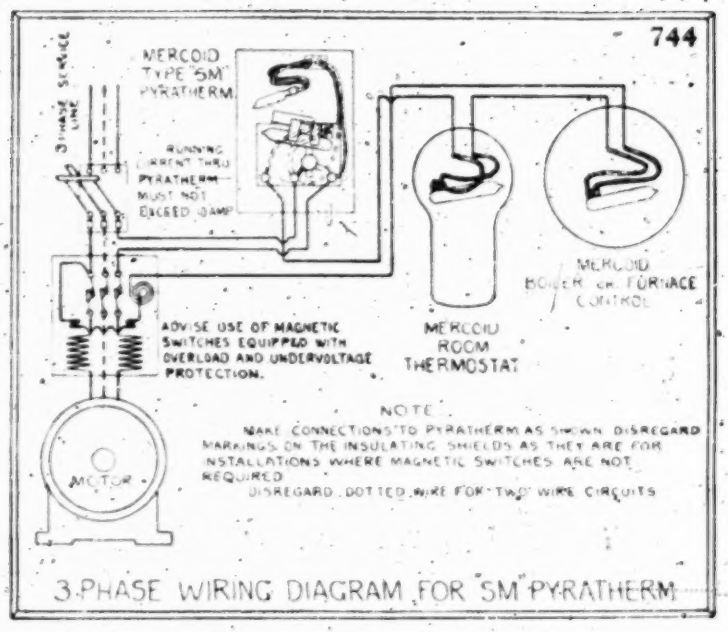
WIRING OF "SM" PYRATHERM AND "ET" IGNITION CONTROL

744

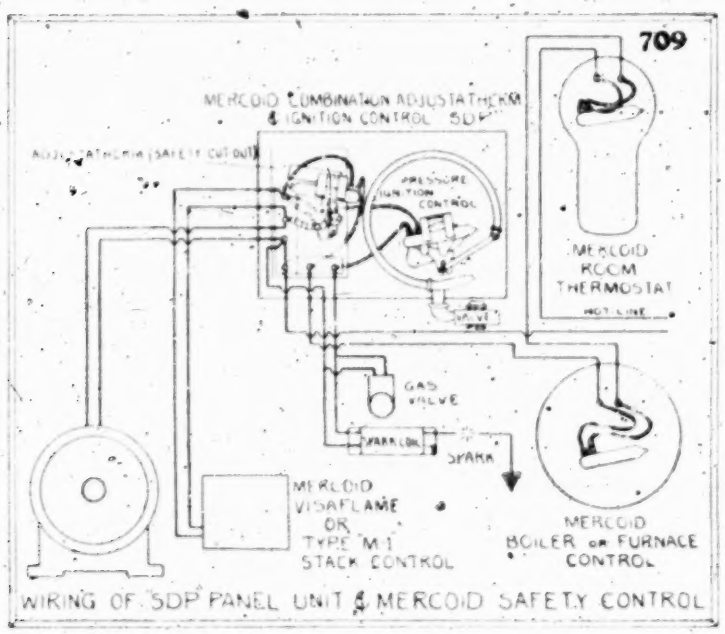


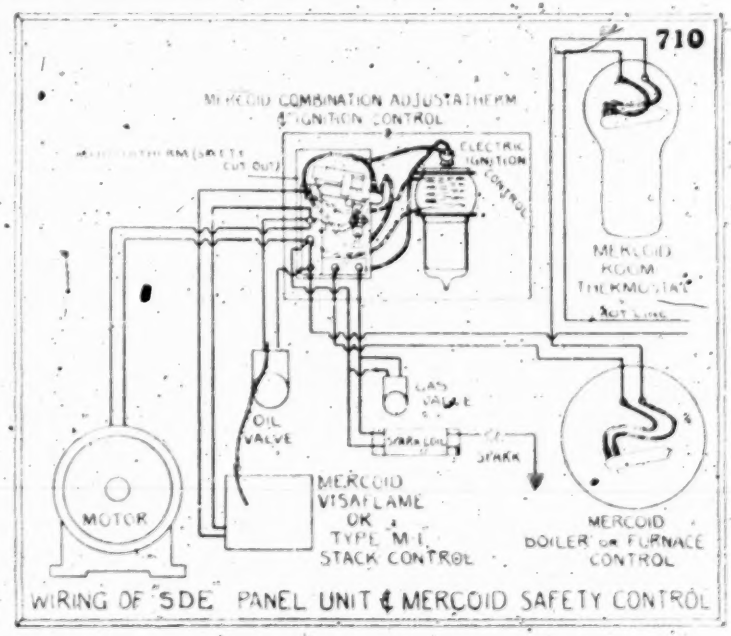
3 PHASE WIRING DIAGRAM FOR "SM" PYRATHERM





The hookups shown above are typical of the usual oil burner installations in connection with the Pyratherm Type SM

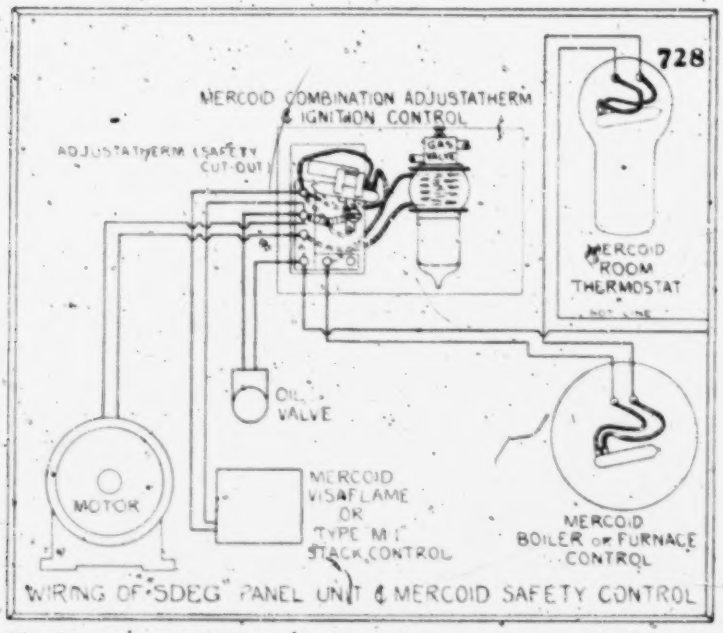


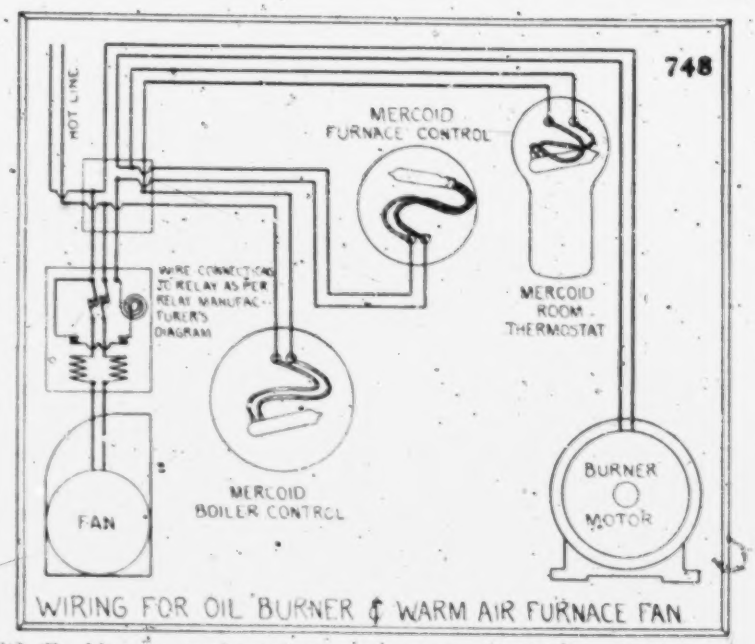


The hookups shown above are typical of the usual oil burner installations in connection with Mercoid Panel units SDP and SDE.

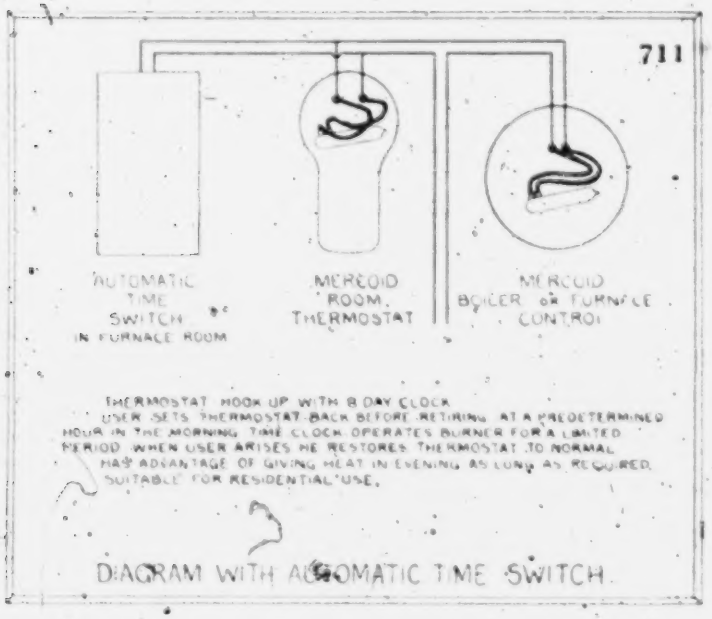
TYPICAL MERCOID WIRING DIAGRAMS

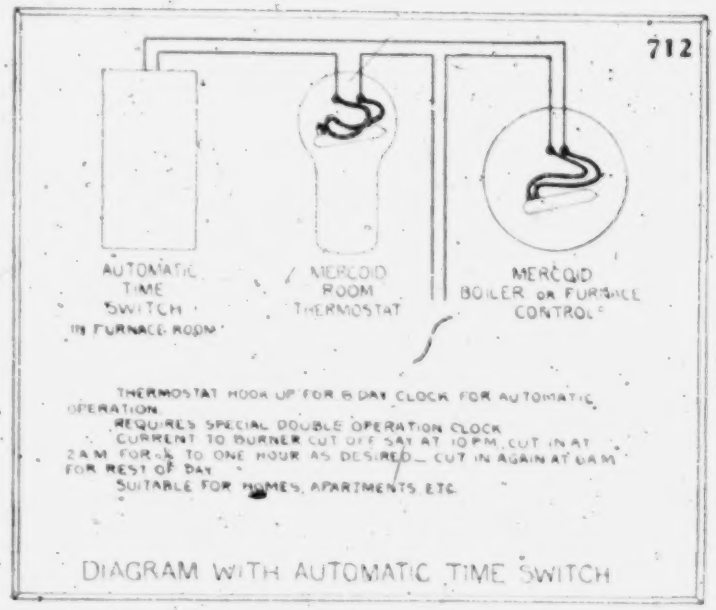
THE simplicity of the Mercoid system of 2-wire direct control is fully recognized. There are no confusing or intricate wiring installations to be made. The hazards and expense of improper hookup are avoided.

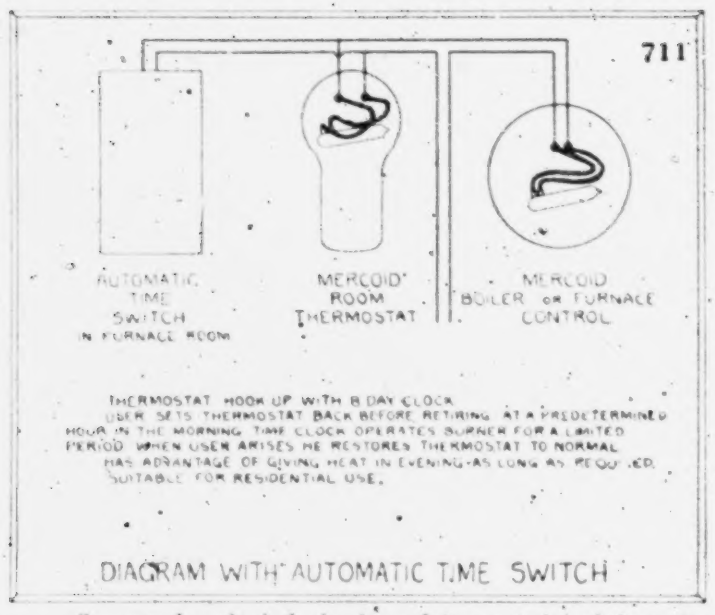


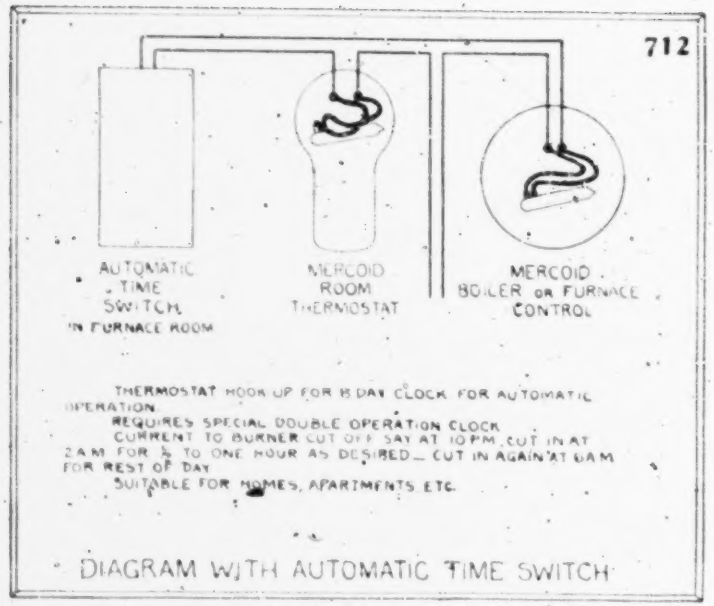


The diagram to the left is a hookup showing the use of Mercoid Panel Unit SDEG. The diagram to the right is connection with the use of Mercoid Figure M-51 and Figure 50.

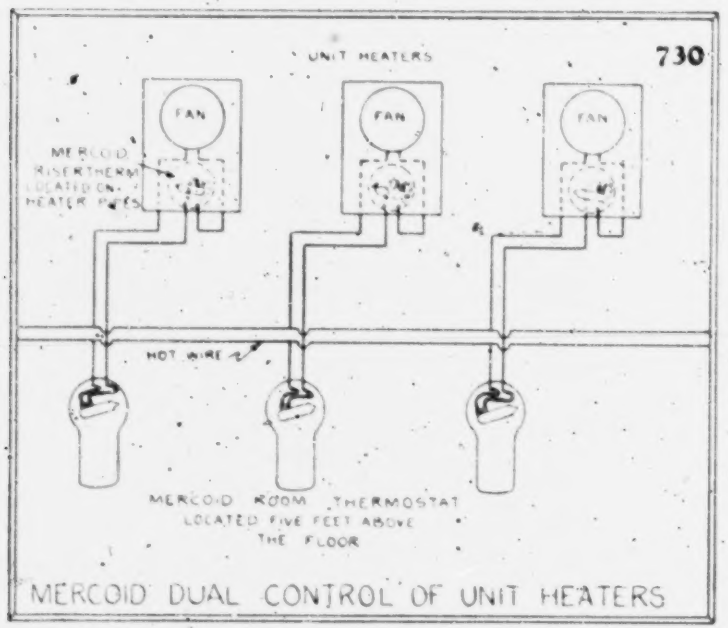


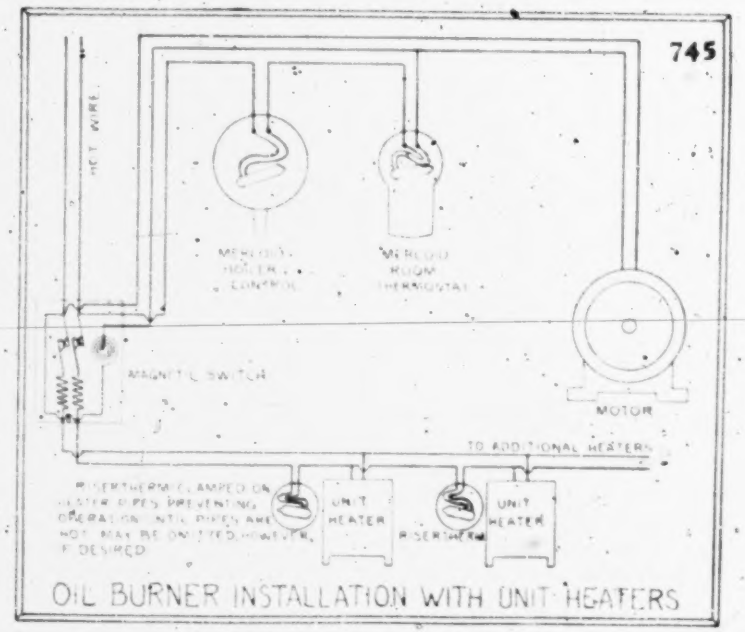






Suggested methods for hookup of time switch and thermostat. Standard time switch may be purchased from local electrical supply house.





The above wiring diagrams show the application of Mercoid Risertherm in connection with Unit Heater installations.

8-7-29
CHARLES A. LAWES CO.
CHICAGO


MERCOID
USED THE WORLD OVER
WARM AIR
FURNACE
CONTROL
M-51
M-52
M-53

Mercoid Furnace Controls

A New Design in Warm Air Furnace Controls Employing a Thermostatic Metal Coil

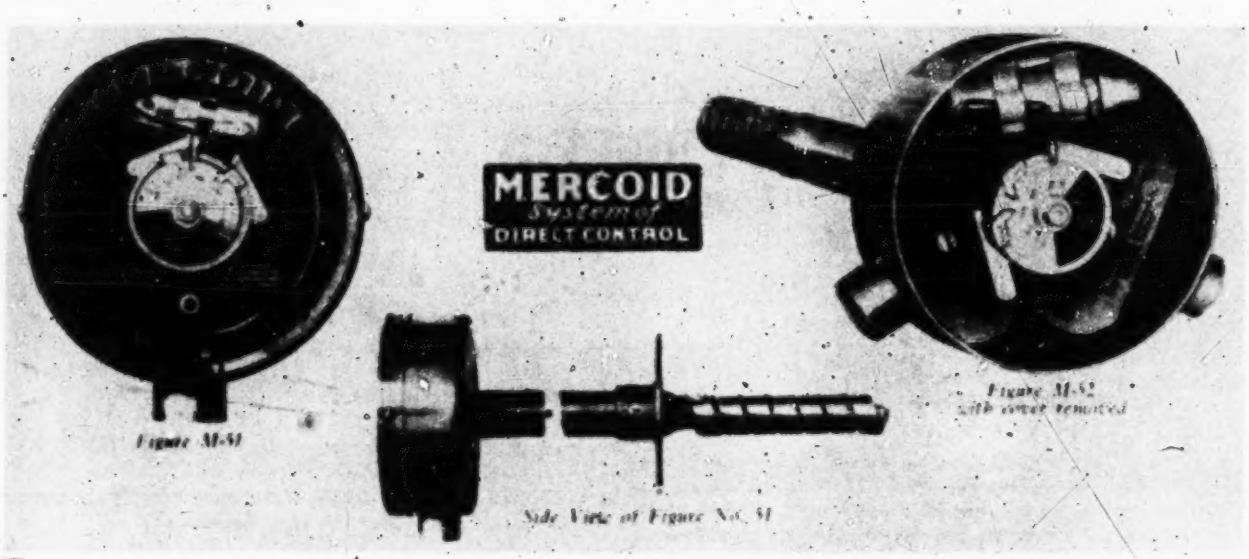


Figure M-51

Figure M-52 with cover removed

Side View of Figure No. 51

FIGURE M-51

The M-51 Mercoid Furnace Control has been designed primarily to prevent the overheating of warm air furnaces in connection with automatic fuel burning systems.

It is of unique construction and provides a positive and complete means of furnace control, at a moderate price.

DOUBLE ADJUSTMENT FEATURE

This instrument has the advantage of a simple double adjustment for both high and low operating temperatures to meet the variety of conditions encountered in warm air furnace installations.

The double adjustment mechanism, located within the case of the instrument and readily visible through the glass front, is easily accessible to the installer yet not subject to accidental disarrangement or casual tampering by unqualified persons. Being a limiting device, designed to guard against excessive temperatures which might cause fire hazards or damage to the furnace itself, it is important that after once correctly set that its adjustment be maintained.

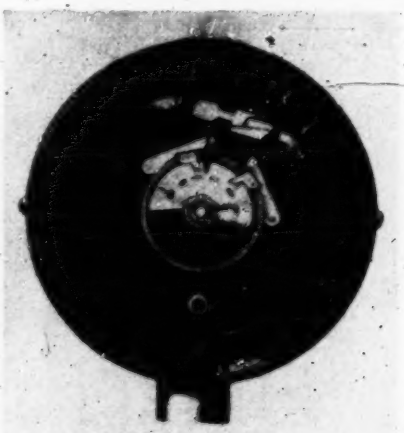


Figure M-53

The fluctuations in furnace temperatures, whether great or small, rapid or slow, are all met by means of this double adjustment feature. What these fluctuations actually are may be determined by means of the temperature indicator in the control.

DUCT TEMPERATURE INDICATOR

The duct temperature indicator, located over the dial, also serves the purpose of a switch tilting arm.

While the accuracy of the temperature indication will vary within certain limits, depending upon the adjustment of the control itself, it is sufficiently accurate for ordinary purposes to enable the service man to check the proper size of fire. In this respect its usefulness is comparable to that of the thermometer on a hot water boiler or the pressure gauge on a steam plant.

BIMETALLIC ELEMENT

The Mercoid Furnace Control is actuated by a single bimetallic element and is designed so that it both controls the switch and indicates the temperature. A novel construction permits the bimetallic element to maintain its natural course after the switch has been thrown to "off" or "on" position.

MERCOID SWITCH

The Mercoid switch used in the M-51 control is of the latest improved type. It has the tipless tube and protected leads. Its construction throughout provides greater efficiency in "make" and "break" contact. It will operate indefinitely without deterioration.

Mercoid Furnace Controls

A Positive Safety Device to Prevent Overheating of Warm Air Furnaces

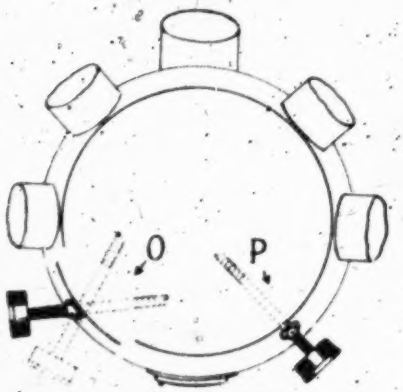


Illustration 5

MERCOID
System of
DIRECT CONTROL

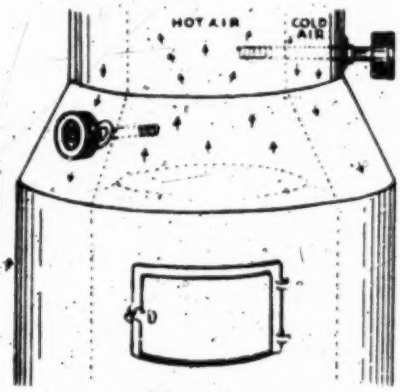


Illustration 6

INSULATION

Since all adjustments are made within the case, ample protection has been provided against accidental contact with live parts or terminals.

TEMPERATURE DIAL

The dial, located in the center of the instrument, is calibrated from 50 to 650 degrees Fahrenheit, in conformance with the physical characteristics of the bimetallic element.

The average furnace temperature range adjustments are likely to be set somewhere between the 200 and 400 degree marks.

FLANGES

There are two types of flanges, which will enable the installer to place the instrument in almost any required position on the furnace.

The furnace type regularly supplied has a distinctive adjustment feature, which enables the installer to place the instrument on the hood of a furnace where the angle is 45 degrees or less. At a 45 degree angle the instrument will project at a proper level with a radius directly from the center, as shown in "P", illustration 5, or "K", illustration 7. If the angle is less than 45 degrees the correct operating position may still be maintained by turning the flange until the instrument is horizontal. In this case the instrument will not have a direct radius from the center but will tend either to one side or the other, as shown in "O", illustration 5. Where the instrument is placed somewhat on the side of a vertical section of the furnace and it is desired to have the face of the control toward the front, this is accomplished by turning the opening of the flange toward the front, as indicated in "L", illustration 7.

The stack type, furnished only when specified, is suitable for duct installation as shown in "M", illustration 7 or on an upright section of a furnace as shown on right side of pipeless furnace, illustration 6.

Both flanges are made of steel and may be reshaped to fit different contours without any danger of breaking.

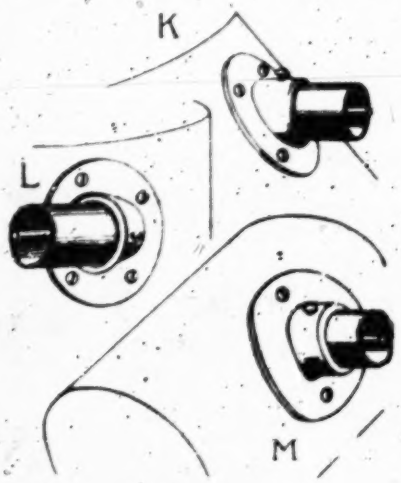


Illustration 7

FIGURE M-52

This control is supplied as a two circuit device for use with three wire systems wherein one circuit is required to be made and the other broken simultaneously.

FIGURE M-53

This control is arranged to make the circuit when the temperature rises and is identical with the M-51 with the exception that the Mercoid switch is reversed. Usually used in connection with booster furnace fan applications.

Shipping weight 4 lbs. 7 oz. Size of instrument 16½" long overall. Diameter of case 4¾".

PRICE LIST

						Single Pole	*Double Pole*
Single Circuit							
M-51 & M-53	10 amperes	110 volts	5	amperes	220 volts A. C. or D. C.	$18.00	$24.00
M-51A & M-53A	3 amperes	110 volts	1½	amperes	220 volts A. C. or D. C.	16.00	18.00
Two Circuit							
M-52	10 amperes	110 volts	5	amperes	220 volts A. C. or D. C.	$24.00	
M-52A	3 amperes	110 volts	1½	amperes	220 volts A. C. or D. C.	18.00	

Installation Instructions

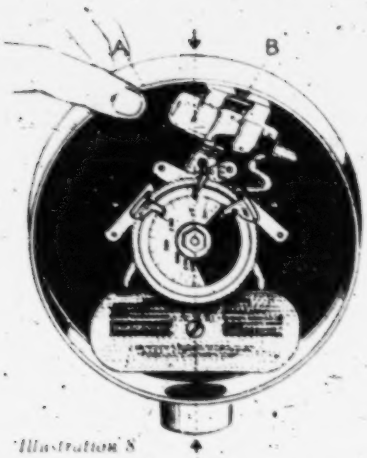


Illustration 8

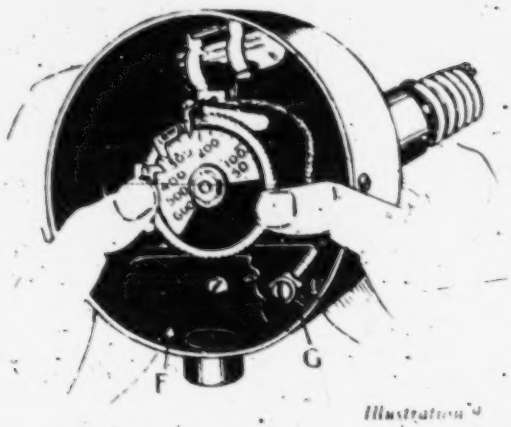


Illustration 9

All instruments should be handled carefully. After removing all packing material note tag warning not to twist the bimetallic element. To do so might distort the metal and disarrange the adjustment which was correctly made at the factory.

Care should be given in selection of proper location for both appearance and operation. Do not locate bimetallic element closer than three inches from the dome.

After proper location has been determined, cut a 1¼" hole in the furnace with a rotary hack saw. Place flange over hole and see that it is perfectly level. This may be done by twisting flange until the proper level has been obtained. Then mark and drill the holes for fastening and attach bolts. Before bolting be sure that the stem when inserted will be perfectly horizontal in position.

If the angular surface of the furnace is less than 45 degrees the instrument will face a little to the right or left and may be placed to the side most desirable, see "O", illustration 5. After the flange has been fastened and the stem properly inserted it is important that the case of the instrument be plumb or vertical in position. This may be determined by separating the high and low adjustable pointers, "C" and "D", illustration 8, far enough apart so they will hold the switch kicking plates away from the switch tripping arm "E". The switch must move freely from left to right without interference of the kicking plates. If the switch remains to the right or left, after tilting with the finger, the instrument is ready to be fastened by tightening set screw on flange.

Connect wires next. Remove insulating plate indicated as "I" in illustration 9 by removing screw located in center of plate. After wires are connected to terminal posts, one of which is shown in drawing as "G", fasten plate back in position.

Then adjust instrument to the desired operating point. While the majority of warm air installations are set at approximately 250 to 300 degrees there are many installations in which this particular adjustment might be insufficient or excessive, therefore a careful study of each case must be made. Bear in mind that the same results of operation can be obtained by locating the bimetallic element farther away from the dome and adjusting it to operate at a lower range. When setting the cut-in and cut-out points, hold the ratchet wheel firmly with one hand while pressing and moving either the high or low pointer; see illustration 9. When pressing pointers see that the catch between the teeth of the ratchet wheel is disengaged, as shown in "I", illustration 10. When releasing the pressure be certain that the catch is again engaged, as shown in "J".

At no time should the instrument be subjected to more than 650 degrees Fahrenheit.

The instrument leaves the factory with the bimetallic element properly heat-treated, formed, stabilized and calibrated. Should the temperature reading be in error due to someone's twisting the bimetallic element, if not excessively twisted, it may be readjusted by allowing the instrument to reach room temperature, loosening the nut in the center of dial and moving dial until correct reading is obtained, after which the nut should be tightened.

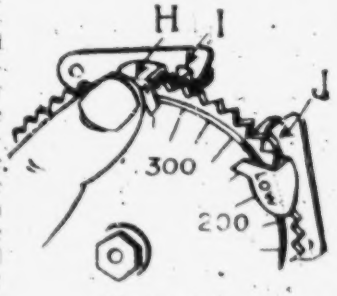


Illustration 10

Any manual twisting or bending of the element may permanently distort it. Not only will this destroy the correct calibration of the instrument but also the accurate performance after adjustment is made. It is recommended in case of a badly distorted bimetallic element, that the instrument be either sent back to the factory for re-calibration or a new bimetallic element ordered for replacement. In ordering element for replacement the serial number of the instrument should be supplied.

THE MERCOID CORPORATION

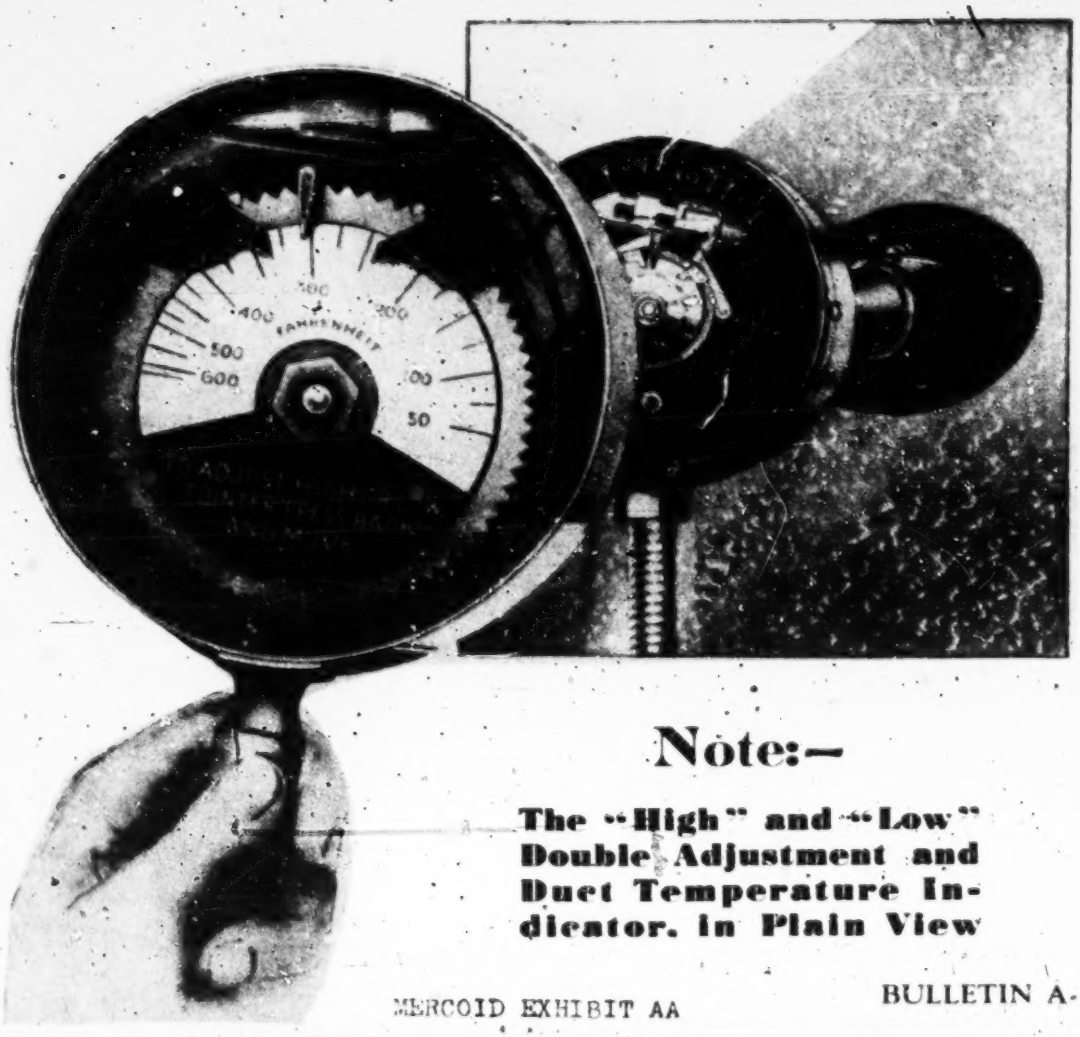
504 WEST ADAMS STREET, - Chicago, Illinois, U. S. A.

25 CHURCH STREET
New York, N. Y.

1129 FOLSOM STREET
San Francisco, Calif.

Cable Address "Mercoid" Chicago

MERCOID M-53
WARM AIR FURNACE FAN CONTROL



Note:—

The "High" and "Low" Double Adjustment and Duct Temperature Indicator, in Plain View

MERCOID EXHIBIT AA

BULLETIN A-5

THE MERCOID CORPORATION

4201 BELMONT AVENUE

Chicago, Illinois, U. S. A.

25 CHURCH STREET
New York, N. Y.

3129 FOLSOM STREET
San Francisco, Calif

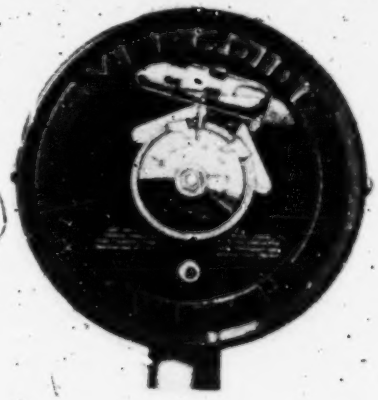
Cable Address "Mercoid" Chicago

Mercoid distributors are located in the larger cities of the United States, Canada, Great Britain, Denmark, Australia, New Zealand and other parts of the world

Mercoid M-53 Warm Air Furnace Fan Control

The Ideal Control for All Types of Booster Fan Applications. Sturdy in Construction. Reliable Performance. Indicates the Temperature in the Furnace Jacket. Meets practically all Operating Conditions. Its use is fully protected under Reissue Patent Number 15,531.

(Additional Patent Nos. 1,98874, 1,98960, 1,70980 Others pending.)



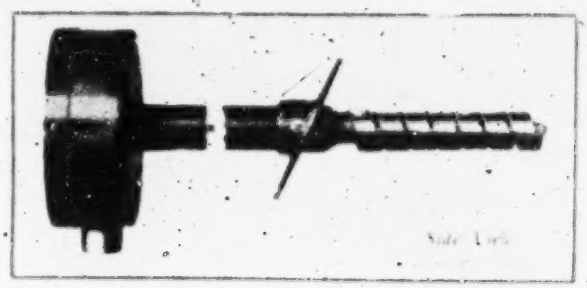
THE efficiency of a warm air furnace is greatly increased through the use of a Mercoid controlled furnace fan, which operates economically, is convenient to adjust and saves fuel and time. It may be applied on any warm air furnace, where coal, oil or gas is used for fuel.

The Mercoid M-53 Warm Air Furnace Fan Control is neat in appearance and constructed to render dependable service.

It is equipped with the Mercoid Tipless Tube, the latest development in enclosed mercury contact switches.

The average furnace temperature range adjustment, on controls for booster fan application, is usually somewhere between 120 degrees and 150 degrees, but this may be varied to suit individual conditions. When the furnace delivers heat at a temperature of 150 degrees or higher, the fan starts and it continues to operate until the temperature drops to 120 degrees or less, when the fan will stop.

Where the hook-up includes a Mercoid room Thermostat the fan starts at the cut-in point of Control M-53 after the temperature in the furnace hood reaches 150 degrees. The thermostat in the room, if set at 68 to 70 degrees, will stop the fan when the room temperature rises to 70 degrees, and again start the fan when the temperature goes below 68 degrees, providing the temperature has not dropped below the cut-out point of the M-53 control, thus maintaining a uniform temperature. The M-53 control in this hook-up prevents the fan from blowing cold air in the rooms if the furnace is not hot enough to deliver heat.



The mechanism (in the M-53 Furnace Fan Control) has many outstanding features. It is unique in design and has the advantage of a simple double adjustment, for both high and low operating temperatures, to meet the variety of conditions encountered in warm air furnace installations.

The fluctuations in furnace temperatures, whether great or small, rapid or slow, are all met by means of this double adjustment feature. These fluctuations may be determined by means of the duct temperature indicator located over the dial, which also serves the purpose of a switch-tilting arm.

While the accuracy of the temperature indication will vary within certain limits depending upon the adjustment of the control itself, it is sufficiently accurate (for

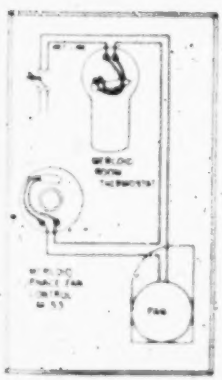


Illustration 4
Simple diagram generally used for coal burning applications.

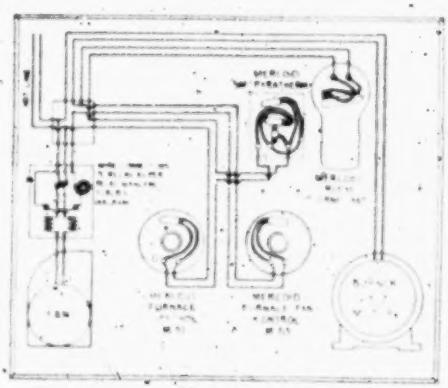


Illustration 5
Diagram used where the current capacity of the two motors exceeds 10 amperes, making it necessary to use a relay or magnetic starting switch.

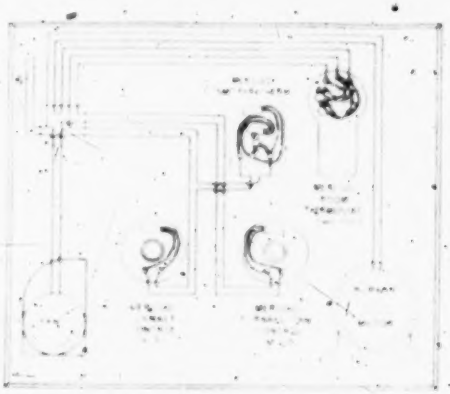


Illustration 6
Diagram used where current capacity of each motor does not exceed 10 amperes, 110 volts. A single pole thermostat can be used when the combined motor load does not exceed 10 amperes, 110 volts.

ordinary purposes) to enable the service man to check the proper size of fire. In this respect its usefulness is comparable to that of the thermometer on a hot water boiler or the pressure gauge on a steam plant.

The dial, located in the center of the instrument, is calibrated from 50 to 650 degrees Fahrenheit, in conformance with the physical characteristics of the bimetallic element which actuates the control. This element is designed so that it both operates the switch and indicates the temperature. Its novel construction permits the bimetallic element to resume its natural course after the switch has been thrown to "off" or "on" position.

Where used on furnaces heated by oil burners, the M-53 fan control usually employs additional controls on such equipment, as shown in the wiring diagrams, illustrations 5 and 6, and listed elsewhere.

Two types of flanges are available, permitting the instrument to be placed in almost any required position.

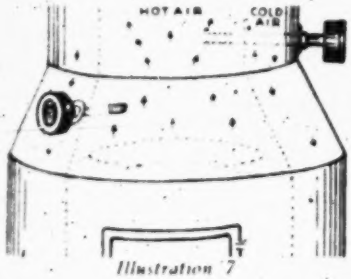


Illustration 7

The furnace type, regularly supplied, has a distinctive adjustment feature which enables the installer to place the instrument on the hood of a furnace where the angle is 45 degrees or less. At a 45 degree angle the instrument will project at a proper level with a radius directly from the center, as shown in "K" illustration 8, and on the left side of illustration 7. If the angle is less than 45 degrees the correct operating position may still be maintained by turning the flange until the stem of the instrument is horizontal and the face of the instrument parallel with the front of the furnace.

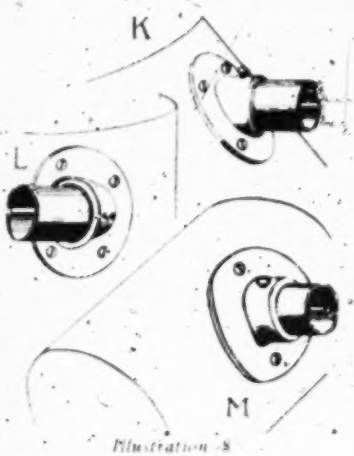


Illustration 8

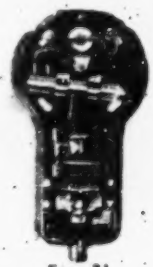
The stack type flange, furnished only when specified, is suitable for duct installation as shown in "M" illustration 8, or on an upright section of a furnace as shown on the right side of a pipeless furnace illustration 7.

Both types are made of steel and may be reshaped to fit different contours without any danger of breaking.

MERCOID CONTROLS

The following controls may be used in conjunction with the M-53 control on certain types of installations.

Mercoid Thermostat Figure 21


Fig. 21

The Mercoid Thermostat is designed to control an electric circuit through changes in room temperature. For warm air systems, equipped with booster fans, positive and reliable performance is assured by the use of the Mercoid Thermostat.

This instrument has been proven in service over a long period and has established a record for accurate unfailing performance.

STANDARD RANGE:

56 degrees to 80 degrees Fahrenheit with 2 degrees operating differential.

LIST PRICES	Fig. 21
Single Pole	$30.00
Two Pole	36.00
Two Circuit	36.00
For Special Range, add	4.00

Where thermometer is specified on any of above types, add $2.00.

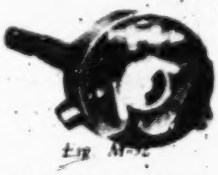
Mercoid Furnace Control Figure M-51


Fig. M-51

The M-51 Mercoid Furnace Control has been designed primarily to prevent the overheating of warm air furnaces in connection with automatic fuel burning systems. The construction of this control is similar to the M-53, with the exception that the position of the switch is reversed.

Single Circuit	PRICE LIST	Single Pole	Dbl. Pole
M-51	10 amps. 110 v. 5 amps. 220 v. A.C. or D.C.	$18.00	$24.00
M-51A	3 amps. 110 v. 1½ amps. 220 v. A.C. or D.C.	16.00	18.00

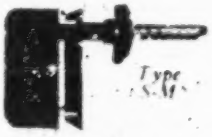
Mercoid Furnace Control Figure M-52


Fig. M-52

This control is supplied as a two circuit device for use with three wire systems where one circuit is required to be made and the other broken simultaneously.

TWO CIRCUIT		
M-52	10 amps. 110 v. 5 amps. 220 v. A.C. or D.C.	$24.00
M-52A	3 amps. 110 v. 1½ amps. 220 v. A.C. or D.C.	18.00

Mercoid Pyratherm Type SM


Type S-M

The Mercoid Pyratherm Type SM is a complete stack safety control, combining two instruments in one: Type M Pyratherm Stack Safety Control and Type S Adjustatherm Safety Cutout. Designed for flue installation, providing protection against flame or ignition failure.

Used on burners having either constant ignition or constant gas pilot, or where the ignition is a separate feature.

LIST PRICE	
Type SM Pyratherm with Adjustatherm	$30.00

PRICE LIST M-53 FAN CONTROL

	Single Circuit	Single Pole	Double Pole
M-53	10 amperes 110 volts 5 amperes 220 volts A.C. or D.C.	$18.00	$24.00
M-53A	3 amperes 110 volts 1½ amperes 220 volts A.C. or D.C.	16.00	18.00

Shipping weight 4 lbs. 7 oz. Size 16½" long overall. Diameter of case 4¾".

Installation Instructions

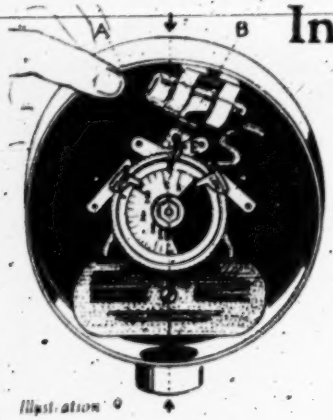


Illustration 9

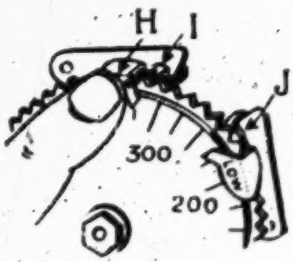


Illustration 10

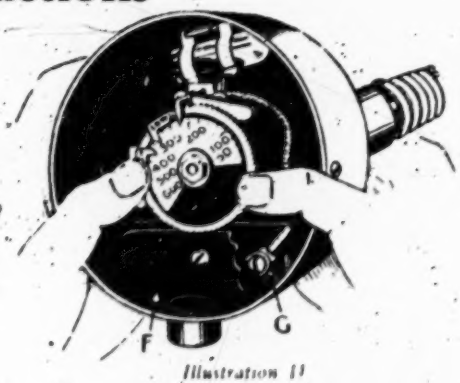


Illustration 11

All instruments should be handled carefully. After removing all packing material note tag warning not to twist the bimetallic element. To do so might distort the metal and disarrange the adjustment which was correctly made at the factory.

Care should be given in selecting a proper location for both appearance and operation. Do not locate bimetallic element closer than three inches from the dome.

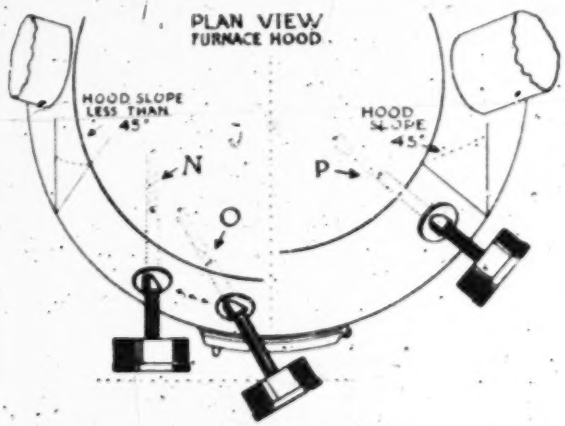


Illustration 12

The instrument is usually placed on the sloped hood of the furnace. If the slope has an angle of 45 degrees the instrument will always be at a radius from the center of the dome.

If the slope is less than 45 degrees from the vertical, more care must be exercised in locating the instrument.

Before attempting to cut a hole, bear in mind two things. First, it is necessary that the stem, when inserted in the flange, be horizontal in position. Next, see that the face of the instrument is parallel with the front of the furnace. Turn and move the flange until you have accomplished both of these things, then mark the location for the hole which may be cut by a rotary hack saw. The size of the hole should be 1¼". Insert the stem in the flange, and if the instrument is in correct position, as above mentioned, mark the holes for the screws. (See envelope for instructions.)

Illustration 12, "P", shows the control mounted on a 45 degree angle. "O", shows an incorrect mounting, where the angle is less than 45 degrees. It should have been moved to the left as shown in "N".

Before fastening set screws, see that the instrument is plumb or vertical in position. This may be determined by separating the "high" and "low" adjustable pointers, "C" and "D", illustration 9, far enough apart so they will hold the switch kicking plates away from the switch tripping arm "E". The switch must move freely from left to right without interference of the kicking plates. If the switch remains to the right or left after tilting with the finger, the instrument is ready to be fastened by tightening set screw on flange.

Connect wires next. Remove insulating plate indicated as "F" in illustration 11, by removing screw located in center of plate. After wires are connected to terminal posts, one of which is shown in drawing as "G", fasten plate back in position.

Then adjust instrument to the desired operating point. For fan control the usual setting is about 120 degrees low to 150 degrees high. In case the M-51 is used as a limiting device, the majority of warm air installations are set at approximately 250 to 300 degrees. There are, however, many installations in which this particular adjustment might be insufficient or excessive, therefore a careful study of each case must be made. **Bear in mind that the same results of operation can be obtained by locating the bimetallic element farther away from the dome and adjusting to operate at a lower range.** When setting the cut-in and cut-out points, hold the ratchet wheel firmly with one hand while pressing and moving either the high or low pointer; see illustration 11. When pressing pointers see that the catch between the teeth of the ratchet wheel is disengaged, as shown in "I", illustration 10. When releasing the pressure, be certain that the catch is again engaged, as shown in "J".

At no time should the instrument be subject to more than 650 degrees Fahrenheit.

The instrument leaves the factory with the bimetallic element properly formed, heat-treated, stabilized and calibrated. Should the temperature reading be in error due to someone's twisting the bimetallic element, if not excessively twisted it may be readjusted by allowing the instrument to reach room temperature, loosening the nut in the center of the dial and moving dial until correct reading is obtained, after which the nut should be tightened.

Any manual twisting or bending of the element may permanently distort it. Not only will this destroy the correct calibration of the instrument but also the accurate performance after adjustment is made. It is recommended in case of a badly distorted bimetallic element, that the instrument be either sent back to the factory for re-calibration or a new bimetallic element ordered for replacement. In ordering element for replacement the serial number of the instrument should be supplied.

Printed in U.S.A.

MERCOID

AUTOMATIC CONTROLS

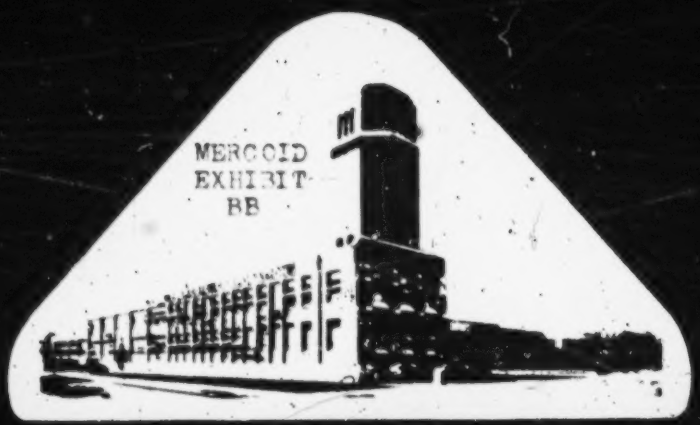
for

STOKERS

and

FORCED DRAFT

COAL BURNING EQUIPMENT



THE MERCOID CORPORATION

23 HUBON STREET
NEW YORK, N.Y.

4201 BELMONT AVENUE
CHICAGO, ILL.

1129 FOLSOM STREET
SAN FRANCISCO, CALIF.

BULLETIN A-4

MERCOID CONTROLS

THE design and construction of Mercoid controls insure ease of installation and satisfactory performance, with freedom from service expense and replacements.

The advantages of the Mercoid 2-wire system of direct control are recognized, as manifested by an ever-increasing demand.

They are made for automatic or semi-automatic direct control of motors where the normal working load does not exceed 10 amperes at 110 volts or 5 amperes at 220 volts, A.C. or D.C. As pilot switches, where used in series with the proper starting switch, Mercoids will automatically control motors of the largest size. No transformers are required for voltages up to 220.

All types of Mercoid controls employ a sealed glass tube switch, containing inert gases and mercury. There are no exposed conducting surfaces, therefore, the possibility of open arcing, oxidation or corrosion is eliminated.

Mercoid switches are actuated by a snap action movement, which locks the switch at both the "on" and "off" points, preventing premature or erratic operation as the result of a jar or mechanical vibration. MERCOID CONTROLS are listed as standard by the Underwriters' Laboratories, Incorporated.

Every Mercoid Control is carefully tested and inspected before leaving the factory, and if properly installed will give years of satisfactory service without further attention. They should be handled with the care which any instrument of close accuracy requires.

Before installing Mercoid Control check the nameplate to be sure that the operating range is suitable for the condition to be met, and then carefully install after fully reading the installation instructions packed with each control.

Our Guarantee

We guarantee Mercoid instruments to be free from defects in workmanship or material and will, without charge, replace or repair within one year from date of shipment from our factory, any instruments that may be found defective upon inspection at our factory. This guarantee does not obligate us where instruments have been injured by careless handling or by improper application or installation.

THE MERCOID CORPORATION

ORDERING DATA

IMPORTANT

Mercoid Controls have many varied applications where equipment other than standard is required. Special controls can be furnished without great delay and at moderate prices. When writing for additional data give full information as to the requirements to be met.

It is important that the following information should appear on all orders to insure shipment of the correct material, and to prevent delay occasioned by writing for additional information.

1. Figure or model number.
2. Kind of control.
3. Temperature or pressure range. Specify range and exact cut-in and cut-out points required.
4. Capacity of switch (10 ampere, 3 ampere, etc.).
5. Whether single circuit, two circuit or double pole.
6. If single circuit or double pole, whether to make or break on rising temperature or pressure.

REPAIRS AND CREDITS

Repairs in the field are in most cases impractical. We are equipped to give satisfactory service at reasonable cost.

Returns for credit or for exchange must not be made without our consent. Credit allowed will be subject to 10% deduction for handling and inspection, plus a further charge for recalibrating or refinishing, if necessary. Specially made instruments cannot be credited except at what we determine is fair value to us.

All instruments returned must be carefully handled and properly packed for shipment.

TYPE M-61 STOKER CONTROL

The Type M-61 Mercoid Stoker Control has many outstanding features. It is sturdily constructed and has the advantage of a simple double adjustment, for both "high" and "low" operating temperatures, to meet the variety of conditions encountered in stoker installations. Range adjustable from 50 to 650° F.

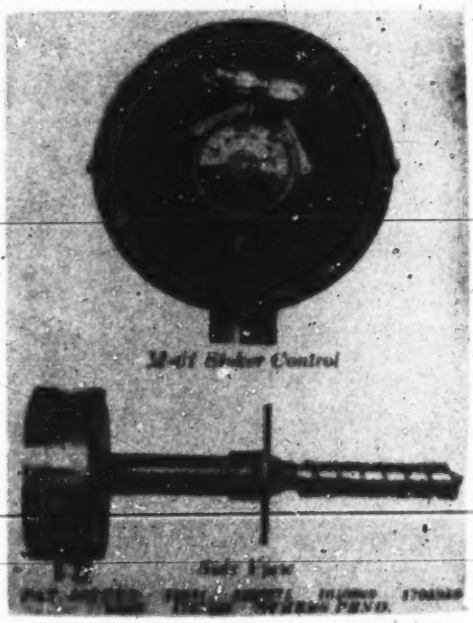
The temperature indicator located over the dial serves the same purpose as a thermometer, and will assist at the time installation is made in determining the proper size of fire required and in correctly setting the controls.

The efficiency and general operation of a stoker will be improved by the use of the Type M-61 Mercoid Stoker Control.

When this control is mounted in the stack, set for a low operating temperature, approximately 115 to 130° F., and connected in parallel with the thermostat circuit, it will operate the stoker intermittently for short periods at a time, when the thermostat is in the "off" position. This will not only prevent the fire from going out, but will also maintain a low and even fire bed. (See wiring diagrams.)

When the Fig. M-61 Mercoid Stoker Control is connected in series with the thermostat circuit, and set for a high operating temperature (from 300 to 450° F., depending upon boiler capacity and load on system) the efficiency of the stoker will be increased and fuel will be saved.

When the stoker is firing continuously due to the thermostat calling for heat, the combustion gases will continue to increase in temperature. After



a certain temperature is reached, the boiler will be operating at its maximum capacity and further firing would only increase the stack temperature with a resultant waste of fuel. The Mercoid control will stop the stoker from the increase in stack temperature, and the boiler will continue to absorb the heat from the glowing fire bed. When the stack temperature lowers sufficiently the Mercoid control will again start the stoker. This operation will be repeated until the thermostat cuts off.

The Type M-63 Mercoid Stoker Control is identical to the Type M-61 except that it breaks the circuit on a dropping temperature. This control can be employed as an additional safety where required and so set that it will open the circuit and stop the stoker operation in the event the temperature should drop below 100° F. This lower temperature would be reached only in the event the fire had gone completely out, and this control would prevent the stoker from running continually and filling the boiler with fresh coal. A snap switch connected around this control would permit operation of the stoker while the fire was being started.

Type M-51 and M-52 Warm Air Furnace Controls

The Type M-51 Mercoid Control has been designed to prevent the overheating of stoker fired warm air furnaces.

It is identically the same as the Fig. M-61 stoker control, except that it has an adjustable mounting flange and a longer sleeve which permits the bimetal operating coil to extend farther into the furnace. By means of the adjustable flange the instrument can be easily installed on any furnace hood where the angle is from 30 to 90 degrees.

The Type M-52 Mercoid Control is identically the same as the Type M-51, except that it has two separate circuits, the one closing on a dropping temperature and the other on a rising temperature.

On a stoker fired warm air furnace equipped with an air circulating fan, this control serves a dual purpose. It will intermittently fire the stoker for short periods at a time when the thermostat is in the "off" position, and will permit operation of the circulating fan only when the thermostat is calling for heat and the furnace is heated. (See wiring diagram No. 3.)

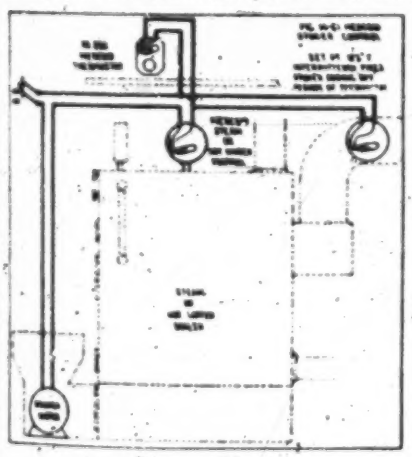


Diagram No. 1

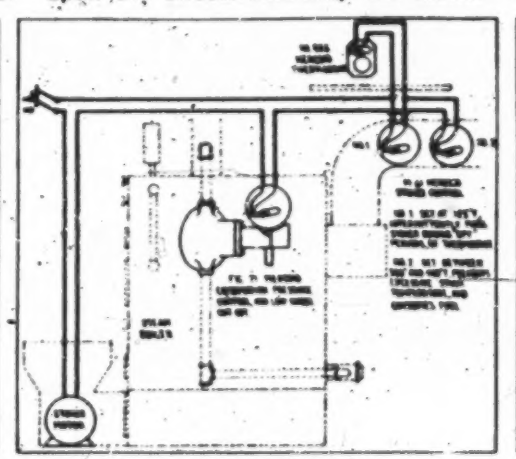


Diagram No. 2

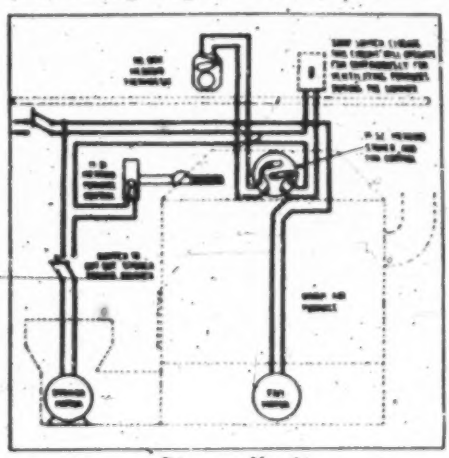


Diagram No. 3

LIST PRICES

	Single Pole	Double Pole	Two Circuit
Type M-61 Stoker Control, 10 Amp	$18.00	$22.00	
Type M-63 Stoker Control, 10 Amp	18.00	22.00	
Type M-51 Furnace Control, 10 Amp	18.00	22.00	
Type M-52 Furnace Control; 10 Amp			$22.00

Shipping Weight, 4 lbs., 14 oz.

MERC ID EXHIBIT CC



MERCOID

COMBINATION FAN AND LIMIT CONTROL FOR WARM AIR FURNACES

MERCOID COMBINATION FAN AND LIMIT CONTROL

Heretofore all automatically fired warm air furnaces equipped with a fan or blower required two separate Mercoid Controls, but these controls may now be had in a single unit in the Mercoid Combination Fan and Limit Control, at a saving over the use of two instruments.

Why a Limit Control is Necessary

The function of a limit control is to protect the furnace from overheating. For example, if the thermostat should be subjected to a cold draft of air from an open window or door, it would cause the electrical circuit of the thermostat to remain closed and continue to call for heat until the cold draft is removed. In the meantime, the oil burner, stoker or gas burner (whatever the case may be) would operate at capacity and very likely result in overheating the furnace, but for the interception of the limit control, which is set at a high predetermined temperature to stop the operation of the heating equipment under such circumstances. However, as soon as the temperature drops to the low predetermined setting of the limit control, the burner will start again, and in this respect, the limit control functions as a thermostat until the abnormal condition surrounding the thermostat is corrected.

The Use of a Fan or Blower Control

The other control, widely used on warm air furnaces, is a fan or blower control, which regulates the operation of a fan or blower.

It is a fact that equipping a warm air furnace with a fan or blower increases the efficiency of the furnace and also economizes on fuel. That is why blower equipped furnaces are rapidly growing in popular favor. They also lend themselves to cooling or air conditioning applications during hot weather. For this type of application, the Mercoid Fan Control has been the accepted control by the trade.

Features of the Mercoid Combination Control

The Mercoid Combination Fan and Limit Control retains all of the outstanding features of the Mercoid Type M-53 Fan Control and Type M-51 Limit Control.

Temperature Indicating Dial

It has a red dial in plain view located at the center of the instrument. The dial is calibrated in Fahrenheit degrees with a scale in duplicate—one scale to each side of the dial. A temperature indicating pointer is provided for each scale to facilitate the reading of the temperature in the furnace hood or duct.

Being able to readily determine the duct temperature has proven to be a popular feature on Mercoid Furnace Controls. It serves the same purpose as a thermometer on boilers. This information enables one to check the proper size of the furnace fire and facilitates making necessary adjustments.

Simplified Double Adjustments

Both "high" and "low" adjustment levers are provided with pointers, which plainly show the operating settings of the fan and limit contol. All adjustments are easily made by simply pressing the finger on the respective levers and moving them to the desired setting as shown in Illustrations No. 1 and No. 2. As the finger is released, the

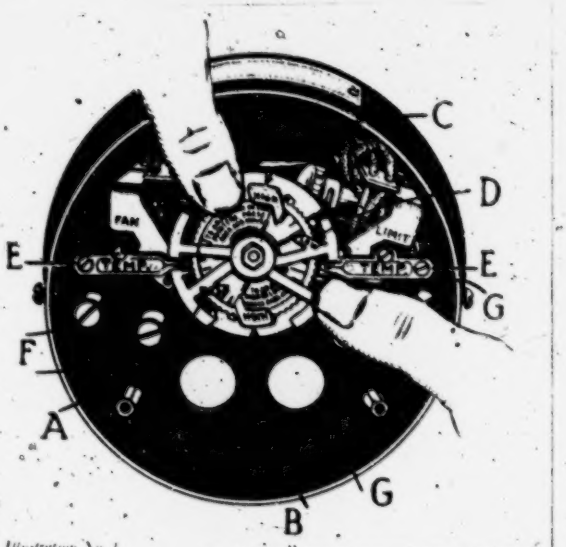


Illustration No. 1

Above illustration shows the detail construction of the control more clearly and the manner the operating adjustments are made. L and R are the adjustment levers for the fan switch to the left "C" and "D" for the limit switch to the right. E E temperature indicating pointers. F wiring terminals for fan switch. G wiring terminals for limit switch. The insulating shield which must be replaced after connections are made is not shown above.



Illustration No. 2

This picture is a detailed illustration showing how the respective high and low adjustment pointers W and X are released from the tooth wheel while pressing adjustments to move them to the required setting. Y and Z when free they automatically go back into the locking position.

setting is automatically locked in the tooth wheel as shown in Illustration No. 2.

Each lever adjustment is plainly marked, thereby eliminating any possible confusion when setting the operating temperatures for both the fan and limit switches in this control.

Mercury Contact Switches Used

An important consideration when selecting an automatic control is to note the type of switch used. The "making" and "breaking" of an electrical circuit of any control, must be positive to insure trouble-free performance, otherwise, it defeats its own purpose.



Type of Switch used in Mercoid Combination Fan and Limit Control

There are two hermetically sealed mercury switches used in the Mercoid Combination Control. The one located on the left side, is the fan switch, while the one to the right, is the switch for the limit control.

Mercoid Switches have a number of patented features, which make them outstanding in mercury switch construction. The utmost care and skill are exercised in the making of these switches. Selected material of given specifications must be used throughout. It is amazing to see the amount of detailed attention, operations, tests and inspections that Mercoid Switches are subjected to before they become a working part of a Mercoid Control.

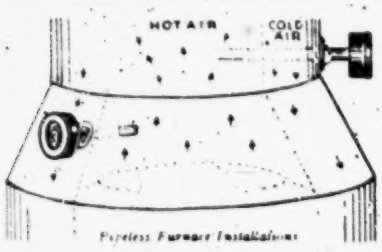
Mercoid Switches cannot be affected by dust, dirt or corrosive gases. They are immune to any adverse surrounding conditions. Millions of these switches have been in the field over a long period of years and are working as perfect today, as when first installed. No cleaning of contacts, or other attention is ever required. There can be no open arcing, pitting of contacts, oxidation or deterioration.

Mercoid Switches are "built to endure," insuring reliable service indefinitely.

Adjustable Mounting Flange

Warm air furnaces usually have a sloping hood which is a characteristic construction, however there is a tendency towards straight-line jacket design in many of the present day types.

All instruments must be placed in a level position to insure proper operation. After a suitable location is determined according to the various field conditions, as shown in Illustration No. 3, a small hole, large enough to permit the insertion of the bimetal stem of the instrument, is cut into the sloped side of the hood.



Pipeless Furnace Installation

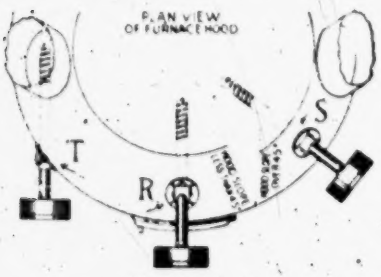


Illustration No. 3

The illustration above shows the flexibility of the adjustable flange in adapting the control to varying installation requirements. "T" shows a mounting where internal obstructions do not permit it to be placed at radius from the center as shown with "R" and ... which position is the usual practice.

The Mercoid Combination Fan and Limit Control is provided as standard with a special adjustable mounting flange, which makes it very easy to mount the control within a 30 to 90° angle and then lock it in a fixed position by means of a locking nut. See illustration No. 4.

Flat flange for mounting control on a flat surface and curved flanges for curved surfaces are available on order.



Illustration No. 4

K Flange Bolt. "L" Instrument Stem
N Retaining Clamp "O" Locking Nut
"P" Flange Bracket

Control Operation

The method of operation of the Mercoid Combination Control is positive, simple and dependable.

The instrument is actuated by means of a helix shaped bimetal coil, which is constant in action, durable in construction and yet very sensitive in its response to temperature changes taking place in the furnace hood.

This bimetal coil serves a two-fold purpose by operating the control mechanism and giving an accurate furnace temperature reading on the dial of the instrument.

A rising temperature rotates the coil in one direction while a dropping temperature rotates it the opposite way. The end of the bimetal is fastened to a shaft, which turns with the coil and operates cams that throw the switches in the "off" and "on" position according to the predetermined settings of the control.

When the temperatures go beyond the control setting, the coil is permitted to turn freely without any strain on the bimetal, therefore, assuring accurate control performance over a long period of time.

Mercoid Fan and Limit Controls are sturdy in construction, compact and neat in appearance, easy to install and adjust. They give complete all around satisfaction.

Special Requirements Available on Order

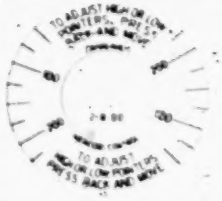
In localities where there are ordinances with certain temperature limiting codes that must be complied with, we can furnish stops on the dial, which prevent the adjustment from being set above the specified temperature limitation.

Certain localities require a barrier or a combinatio control, to keep the high voltage wiring connection se arated from the low voltage wires, where both low ar high voltage wires come into the same instrument as ma be the case when the control is used with a fan and dampe motor. The barrier may be applied in the field, and is available upon order.

The Mercoid Combination Fan and Limit Control is available in two different ranges, each having a separate type number as shown in the following illustrations:



The illustration above shows dial with range from 50—300° as used on Type M-80



The illustration above shows dial with range from 50—225° as used on Type M-82

List Price

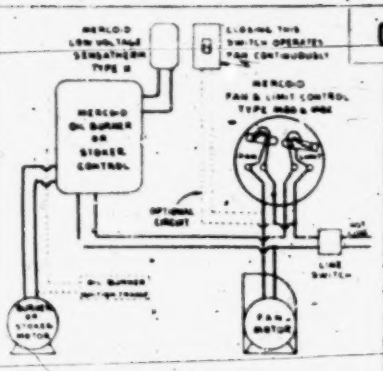
Both instruments are standard for either A.C. or D.C. 10 amp. 110V., 4 amp. 220V., motor rating 1.H.P. Repulsion-Induction. ½ H.P. D.C. 110 or 220V., D.C. and ½ H.P. split phase.

Type M-80	Range 50—300° F.	15.00
Type M-82	Range 50—225° F.	16.00

Shipping weight approximately 6 lbs.

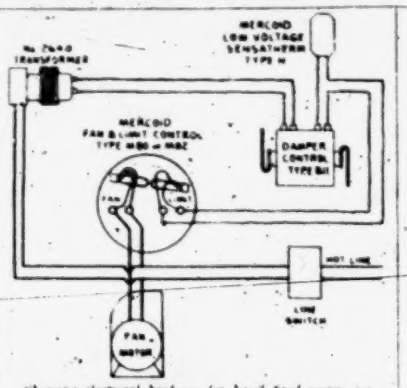
Wiring Diagrams shown on next page

COMBINATION CONTROL WIRING DIAGRAMS

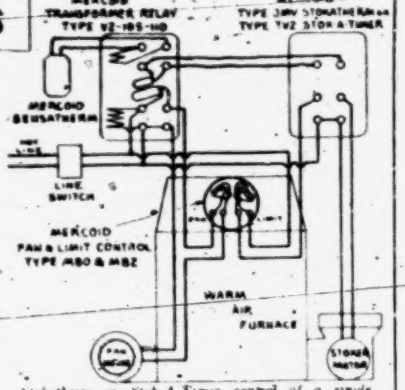


Fan hook-up in connection with oil or stoker fired warm air furnace. Closing optional circuit operates fan continuously for ventilating purposes during summer.

With this hook-up after the thermostat is satisfied the fan will continue to run until temperature in the furnace bonnet drops to the control setting.



Showing electrical hook-up for hand fired warm air system employing circulating fan and thermostatically operated damper control



Stokatherm or Stok-A-Timer control of a single phase stoker and circulating fan motors on warm air system. When Sensatherm calls for heat stoker starts but fan can start only after furnace is heated. When room is at required temperature, Sensatherm circuit opens which immediately stops both fan and stoker motor.

OTHER MERCOID CONTROLS FOR VARIOUS WARM AIR FURNACE APPLICATIONS



SENSATHERM

Whether a warm air furnace has a motor driven damper regulator, automatic oil burner, stoker, or gas burner, a thermostat is used in common on all of the above types of automatic heating equipment.

It is the purpose of the thermostat to stop and start the heating plant in order to maintain an even room temperature in accordance with the setting of the instrument. In this respect, the thermostat is the master control of the heating system and should be selected with care and discrimination, to assure uninterrupted comfort in the home.

The Mercoid Sensatherm meets the most exacting requirements of a room thermostat as it is extremely sensitive and requires no artificial acceleration to keep the home uniformly heated.

It is small in size, neat in appearance and mechanically perfect. The mercury switch used in this temperature control is a positive protection against contact trouble and will operate indefinitely without trouble.

In design and finish, the Sensatherm harmonizes with any scheme of interior decoration.



DAMPER CONTROL

MERCOID DAMPER CONTROL SETS



LIMIT CONTROL

The Mercoid Damper Control is designed for reliable automatic regulation of draft and check dampers of heating plants, and is especially recommended for operating duct dampers of zone controlled air conditioning systems.

The popular standard set consists of: Type H Sensatherm, B-11 Damper Control, 110V., 50-60 cycle Transformer and a complete set of accessories ready for installation. Other sets available.



FAN CONTROL

SEPARATE LIMIT OR FAN CONTROLS

The Type M-53 Mercoid Fan Control is very popular with the warm air heating trade. Thousands of these controls are in use, giving satisfactory service. This control has a dial and pointer, which plainly indicates the temperature in the furnace hood. It is equipped with a dust-proof sealed mercury contact switch to insure dependable operation at all times. The "high" and "low" operating adjustments are easy to make.

A flange is provided to facilitate installations on different hood angles.

The Mercoid Type M-51 Limit Control has all of the outstanding features of the fan control.



TYPE KMI



TYPE KM

WHERE OIL BURNERS ARE USED

Warm air furnaces automatically fired by an oil burner, require the addition of a safety control to provide protection against flame or ignition failure. The Mercoid KM and KMI Pyratherms are tried and proven safety controls, constructed to give positive protection under all operating conditions. In event of any abnormal conditions, these controls always check to the safe side and stop the burner. Provisions are also made for low voltage protection. These controls are equipped throughout with sealed mercury contact switches to insure years of dependable service. Type KMI (illustration to the left) is for use on burners employing intermittent ignition. Type KM (illustrated to right) is for use on burners with constant ignition. Thousands of these controls are out in the field giving complete satisfaction under varying operating conditions.



STOKATHERM



STOK-A-TIMER

WHERE STOKERS ARE USED

Warm air furnaces fired by a coal stoker require a control to regulate and maintain a low fire while the thermostat is not calling for heat.

The Mercoid Stokatherm has features not found in other stoker controls. It does not depend upon any fixed stack temperature or fixed timing, but in maintaining the fire employs both methods and new principles of operation. The operation of the control in maintaining the fire is determined by the condition of the fire itself, thus making it possible to maintain a very low fire during this period. Overheating is prevented and fuel is economized. The Stokatherm is for use on anthracite stokers and also for stokers burning a non-coking bituminous coal. This control also has an out-fire feature which prevents feeding coal should the fire go out.

The Mercoid Stok-A-Timer is an improved timer type control and may be used on all types of stokers. It prevents the stoker from operating immediately after the thermostat shuts off. This control is extremely simple to adjust by merely moving a lever over a calibrated dial to the required setting. No tools are required.

THE MERCOID CORPORATION • General Office and Factory, 4201 BELMONT AVE., CHICAGO, ILL.
New York Office: 90 WEST STREET • *Philadelphia Office:* 3137 N BROAD ST. • *Boston Office:* 95 IVY STREET • *Distributors in All Principal Cities*

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INSTALLATION INSTRUCTIONS

MERCOID WARM AIR FURNACE CONTROLS

TYPES M-51, M-52, M-53, M-55, M-56, M-57

Patent Numbers 1,390,874, 1,640,869, 1,705,909, 1,732,957, 1,757,436, 1,834,898, 1,884,046. Others Pending

CAUTIONS

1. Mercoid Furnace Controls leave the factory with the bi-metallic element properly formed, heat treated, stabilized and calibrated.

DO NOT TWIST THE BI-METAL COIL as any manual twisting or bending may permanently distort it. Not only will this destroy the correct calibration of the instrument but also the accurate performance after adjustment is made. It is recommended in case of a badly distorted bi-metallic element, that the instrument be either sent back to the factory for recalibration or a new bi-metallic element ordered for replacement. In ordering element for replacement the serial number of the instrument should be supplied.

Should the temperature reading be in error due to an accidentally twisted bi-metallic element, if not excessively twisted it may be readjusted by allowing the instrument to reach room temperature, loosening the nut in the center of the dial and moving dial until correct reading is obtained, after which the nut should be tightened.

2. DO NOT OVERLOAD—Check the instrument nameplate which shows the electrical capacity in amperes, and make certain that the load to be handled is within this rating.

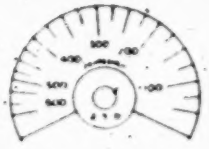
3. DO NOT OIL ANY PARTS—All bearings are self lubricating. Oil accumulates dirt, becomes gummy with age and heat, and interferes with the free operation of the control mechanism.

4. DO NOT OVERHEAT—At no time should the instrument be subjected to a temperature higher than the maximum shown on the nameplate or graduated scale.

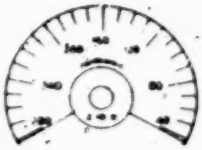
STANDARD DIALS USED ON MERCOID FURNACE CONTROLS



Standard for Type M-51



Standard for Type M-52 & M-54



Standard for Type M-55, M-56 & M-57

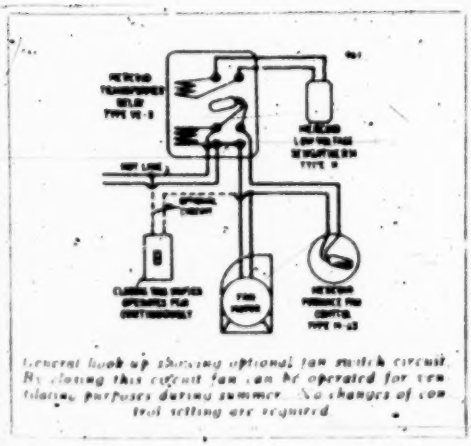
Standard instruments are furnished with bi-metal coils which operate in accordance with graduations on dials as shown.

Note that Type M-51 dial has wide graduations at the top of its range and thus gives close regulation at high temperatures. Type M-53 gives very close regulation at low temperatures but is not sensitive at high temperatures.

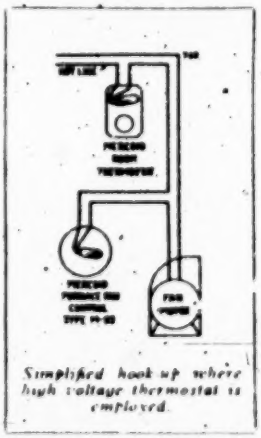
If Type M-51 is desired to give close operation at low temperatures, it can be furnished, at no extra charge, with Type M-53 coil and dial when so ordered. Type M-53 control can also be supplied with Type M-51 coil and dial to give close operation at high temperatures.

Type M-55 and M-57 dial is graduated evenly and gives extremely close regulation at any point on its range. This type instrument should be employed in place of Type M-51 or M-53 when very close operating differentials are desired, and the operating temperature is within the range of this instrument.

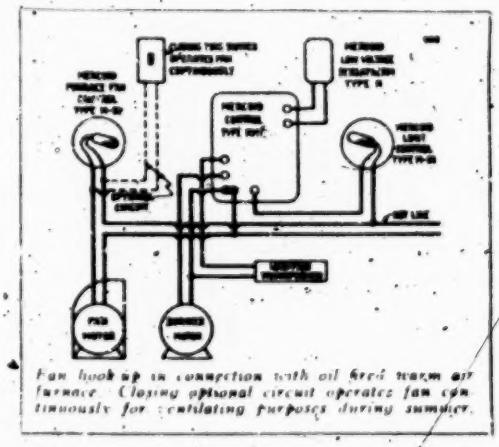
GENERAL WIRING DIAGRAMS



General hook up showing optional fan switch circuit. By closing this circuit fan can be operated for ventilating purposes during summer. No changes of control setting are required.



Simplified hook up where high voltage thermostat is employed.



Fan hook up in connection with oil fired warm air furnace. Closing optional circuit operates fan continuously for ventilating purposes during summer.

(Continued on other side)

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MERCOID EXHIBIT EE

MINNEAPOLIS-HONEYWELL REGULATOR CO.

EXECUTIVE OFFICES
MINNEAPOLIS, MINNESOTA, U. S. A.

FACTORIES MINNEAPOLIS, MINN.
WABASH, IND.

SUBSIDIARIES
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MINNEAPOLIS-HONEYWELL CO.
AMSTERDAM, HOLLAND
HONEYWELL-BROWN LTD.
LONDON, ENGLAND
HONEYWELL-BROWN AB
STOCKHOLM, SWEDEN

January 24, 1940

Mr. Courteol,
The Mercoid Corp.,
4201 Belmont Ave.,
Chicago, Illinois.

Dear Mr. Courteol:

Will you please tell me whether or not you and Mr. McCabe have had an opportunity to give consideration to the matter of licensing under the Freeman Patent along the lines which I discussed with you in Chicago last week.

Very truly yours,

MINNEAPOLIS-HONEYWELL REGULATOR CO.

W. L. Huff

WLH/s W. L. Huff, Vice-Pres. & Treasurer.

A G R E E M E N T

AGREEMENT entered into this ____ day of _____, 1940, by and between MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, a corporation organized and existing under the laws of the State of Delaware and having a principal place of business at Minneapolis, Minnesota, hereinafter called "Licensor" and _____, a corporation organized and existing under the laws of the State of _____, and having a principal place of business at _____, hereinafter called "Licensee",

W I T N E S S E T H:

WHEREAS, Licensor is the owner of United States Letters Patent No. 1,813,732 granted to Edward E. Freeman on July 7, 1931; and

WHEREAS, Licensee is desirous of obtaining a certain non-exclusive license and right under said Freeman Patent No. 1,813,732;

NOW, THEREFORE, in consideration of the sum of One Dollar ($1.00) paid to the Licensor by Licensee, the receipt of which is hereby acknowledged and in consideration of the mutual representations, covenants and agreements herein set out, Licensor and Licensee mutually represent, covenant and agree as follows:

1. Definition of Combination Furnace Control

As used in this agreement, the expression "Combination Furnace Control" shall mean a unitary structure including at least a switching means for controlling not less than two circuits and operated by temperature responsive means responsive to the

temperature of a heating device or the fluid medium heated thereby, one of said circuits being established on temperature rise and another being established on temperature fall, the structure having permanent internal wiring connecting the switching means to terminals for the connection of external wires thereto, the internal wiring being so arranged that when the terminals are connected by external wires to a heat controlling mechanism or a combustion controlling mechanism for the heating device and to a means for controlling the circulation of the fluid medium heated thereby, such structure, when used as intended, embodies the system disclosed in and claimed by the Freeman patent No. 1,813,732.

II. Grant

Licensor hereby grants unto Licensee the non-exclusive right and license under said Freeman Patent No. 1,813,732 to make, use and sell said "Combination Furnace Control" throughout the United States, its territories and possessions.

Subject to the terms and conditions hereinafter set forth, Licensor additionally grants unto Licensee under said Freeman Patent No. 1,813,732 the right and license to show and describe in its advertising and other literature complete systems of control covered by said Freeman Patent, except however, if Licensee has a "Combination Furnace Control" applicable to the system shown in such literature, then the Licensee shall show said "Combination Furnace Control" as an element thereof.

III. Royalties

Licensee covenants and agrees to pay to Licensor an earned royalty of twenty-five cents (25¢) on each "Combination Furnace Control" sold by it.

"Combination Furnace Controls" shall be considered as sold when billed out, or, if not billed out, then when delivered, or when paid for if paid for before delivery; but royalties paid on "Combination Furnace Controls" not accepted by the customer or returned for credit may be credited on future royalty payments.

IV. Records and Reports

Licensee agrees to keep accurate records showing the number of "Combination Furnace Controls" sold by it during the continuance of this agreement and to render quarterly statements to Licensor on or before the fifteenth days of January, April, July and October showing the number of "Combination Furnace Controls" sold by it during the preceding three months and further agrees to accompany each such statement by payment of the royalty thereby shown to be due Licensor.

Licensor shall have the right, through a certified public accountant, to inspect the books and records of Licensee pertaining to sales of "Combination Furnace Controls" in so far as may be necessary to verify the statements provided for herein, but such inspection shall be made during business hours and not oftener than once every three months.

V. Patent Marking

Licensor and Licensee mutually agree that upon each of said "Combination Furnace Controls" sold they will place a name-plate, or a securely fastened tag or a cover insert, which name-plate, or tag or cover insert shall carry upon it, among other things, the following information in clearly legible and reasonably sized lettering or printing:

"Notice - This control is internally wired in a manner to shut down the heat source while permitting blower operation on furnace temperature rise and to stop the blower but permit operation of the heat source on temperature fall. This control and its use carries with it a license for one installation employing the sequence of operation embodying the invention of Freeman Patent No. 1,813,732."

VI. Notice on Literature

Licensor and Licensee mutually agree that they will only illustrate or describe the systems of control covered by the Freeman Patent No. 1,813,732 in their advertising, catalogues or other literature in connection with "Combination Furnace Controls" manufactured and regularly sold by them and that they will include in the copy of such literature and on the drawings or wiring diagrams thereof a statement to the following effect:

"The Freeman Patent No. 1,813,732 covers systems of control in which upon rise in the temperature of a furnace or like heating device, the source of heat is reduced or shut down but the blower or other circulating means is permitted to operate, and in which upon fall in such temperature, the blower or other circulating device is stopped but the source of heat is permitted to heat the furnace or other heating device. This control is specially designed for carrying out the system of the Freeman Patent and its use carries with it a license for one installation employing the sequence of operation of the Freeman Patent No. 1,813,732."

VII. Price Condition

(a) The license granted herein to the Licensee is granted on the express condition that the prices, terms and conditions of sale of "Combination Furnace Controls" made in accordance with the terms of this agreement, shall be not more favorable to the customer than those fixed from time to time by Licensor for its own products embodying the invention covered by said agreement, and Licensee agrees to maintain such not more favorable prices, terms and conditions of sale as to said "Combination Furnace Controls." The prices, terms and conditions of sale shall be set forth in a schedule to be known as a "Price Schedule" and shall be issued from time to time by Licensor and form a part of this Agreement as though herein set out in full, and Licensee, after receiving a "Price Schedule" agrees that it will sell "Combination Furnace Controls" only at prices and on terms not more favorable to the customer than those set forth in said Price Schedule and in compliance with the general sales rules in said Price Schedule. A price schedule is hereto attached and marked "Price Schedule Exhibit A."

(b) Licensor shall give Licensee reasonable notice in writing of any and all proposed changes in said Price Schedule but not less than thirty (30) days' written notice shall be given before any change shall go into effect.

(c) The spirit and intent of this License Agreement contemplate that in no transaction shall there be, directly or indirectly, included any item or extra which shall have the effect of reducing the prices below those set forth in said Price Schedule as it exists from time to time as, for instance, by the inclusion in the transaction of other material or extras for

increasing the value of the "Combination Furnace Control" or parts or labor or services at the prices computed in accordance with the standard method of cost accounting used by Licensee for such extras plus the minimum price for the "Combination Furnace Control." No extras shall be included under any circumstance at a price for such extras at less than what said extras are sold at when sold with some other unit or control. Temperature indicating means to indicate the temperature at the thermal means of the "Combination Furnace Control" and a summer adjustment or locking means to provide fan operation only in the summer shall not be considered for the purpose of this agreement as an extra.

VIII. Duration and Termination

Unless earlier terminated, this agreement shall continue to the full end of the term of said Freeman Patent No. 1,813,732 and any extensions or reissues thereof.

Upon default of any of the conditions herein by Licensee, Licensor may inform the Licensee of such default in writing, and if such default be not remedied within sixty days thereafter by the Licensee, this agreement may be terminated by the Licensor at its election.

Licensee shall not have the right to terminate this agreement before the end of the calendar year 1940, but may cancel at any time thereafter by giving said Licensor a sixty (60) day notice in writing prior to the date of cancellation.

In the event Licensee does not place upon the market as one of its standard items a "Combination Furnace Control" within six months of the execution of this agreement, or if after placing such a control on the market, Licensee ceases to distribute literature and manufacture and sell the same, then,

in such event, Licensor may cancel this agreement by written notice sent to Licensee.

It is understood and agreed, that cancellation or termination of this agreement for any cause shall not relieve Licensee from the payment of any royalties which are due and owing to the Licensor at the time such cancellation or termination becomes effective.

IX. Binding Upon Successors

This agreement and the covenants herein contained shall be binding upon the successors of Licensor and Licensee but the rights granted Licensee herein shall only be assignable by Licensee in connection with the sale of its entire business relating to the temperature control field.

X. Acknowledgment of Validity

Licensee agrees to and does hereby acknowledge, during the life of this Agreement, the validity of said Freeman Patent No. 1,813,732 under which this license is granted and agrees, during the life of this Agreement, that it will not deny or contest its validity or aid others in so doing.

XI. Equality of Terms

Licensor hereby covenants and agrees that in the event it grants to another party a license similar in tenor and scope and having more favorable terms than this Agreement, then in such event, Licensor will and hereby does extend to Licensee the same more favorable terms in this Agreement.

XII. No Other Rights Granted

It is mutually understood and agreed that Licensee receives no licenses or right whatsoever under any other patents or applications owned or controlled by Licensor or under which

Licensor has the right to grant Licenses and rights, and that the limited license and rights hereby granted unto Licensee under the Freeman Patent No. 1,813,732 constitute the only license and rights which Licensee receives hereunder, impliedly or otherwise.

XIII. Waiver for Past Infringement

Licensor hereby waives any and all claims that it may have against Licensee for past infringement of said Freeman Patent No. 1,813,732.

IN WITNESS WHEREOF, the parties hereto have duly caused this instrument to be executed by their proper officers thereunto duly authorized on the day and year first above written.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

By _____

Attest:

_____
Secretary.

By _____

Attest:

_____
Secretary.

PRICE SCHEDULE - EXHIBIT A

Price Schedule forming a part of license agreement involving Freeman Patent No. 1,813,732.

MANUFACTURER

A manufacturer shall be defined as any firm manufacturing and marketing equipment with which Combination Furnace Controls are sold as an original part of, or necessary accessory to their product.

Manufacturer's Price

The net minimum price for a Combination Furnace Control shall be	$ 5.25
The net minimum price for a Combination Furnace Control including a summer switch (manually operable on and off switch for the fan) shall be	5.65
The net minimum price for a Combination Furnace Control operable at two speeds shall be	7.50
The net minimum price for a Combination Furnace Control operable at two speeds including a summer switch (manually operable on and off switch for the fan) shall be	7.90

JOBBER AND WHOLESALER

A jobber or wholesaler shall be defined as a firm that handles Combination Furnace Controls primarily for the purpose of resale to contractors and dealers.

Jobber's or Wholesaler's Price

The net minimum price for a Combination Furnace Control shall be 6.19

The net minimum price for a Combination Furnace Control including a summer switch (manually operable on and off switch for the fan) shall be 6.75

The net minimum price for a Combination Furnace Control operable at two speeds shall be 9.00

The net minimum price for a Combination Furnace Control operable at two speeds including a summer switch (manually operable on and off switch for the fan) shall be 9.56

DEALERS AND OTHERS

Dealers and others shall be defined as all classes of customers not specifically coming within either the classification of a manufacturer or a jobber or a wholesaler as herein defined.

Dealer's and Others' Price

The net minimum price for a Combination Furnace Control shall be 7.84

The net minimum price for a Combination Furnace Control including a summer switch (manually operable on and off switch for the fan) shall be 8.55

The net minimum price for a Combination Furnace Control operable at two speeds shall be 11.40

The net minimum price for a Combination Furnace Control operable at two speeds including a summer switch (manually operable on and off switch for the fan) shall be 12.11

These prices shall become effective not later than thirty (30) days after the execution of the contract of which this Price Schedule forms a part.

MINNEAPOLIS-HONEYWELL REGULATOR CO.
EXECUTIVE OFFICES
MINNEAPOLIS, MINNESOTA, U. S. A.
FACTORIES: MINNEAPOLIS, MINN
WABASH, IND.

W. L. HUFF
VICE PRESIDENT
AND
TREASURER

SUBSIDIARIES:
THE BROWN INSTRUMENT CO.
PHILADELPHIA, PA.
MINNEAPOLIS-HONEYWELL REGULATOR CO. LTD.
TORONTO, CANADA
N. V. NEDERLANDSCHE
MINNEAPOLIS-HONEYWELL CO.
AMSTERDAM, HOLLAND
HONEYWELL-BROWN, LTD.
LONDON, ENGLAND
HONEYWELL-BROWN, A/B
STOCKHOLM, SWEDEN

May 7, 1940

Mr. C. J. Swan
Detroit Lubricator Company
5900 Trumbull Avenue
Detroit, Michigan

and

Mr. Ira E. McCabe
Mercoid Corporation
4201 West Belmont Avenue
Chicago, Illinois

Gentlemen:

In connection with the printed form of licensing agreement which I handed to you in Chicago last week I should at the same time have furnished you with copies of the attached letters, both of which have become a part of this agreement in the cases where licenses have been granted, and these same conditions would apply in connection with any new licenses issued.

Very truly yours,

MINNEAPOLIS-HONEYWELL REGULATOR CO.

W. L. Huff

W. L. Huff, Vice-President & Treasurer

WLH/r
Enc.

Gentlemen:

With reference to the license agreement this day entered into between and Minneapolis-Honeywell Regulator Company under Freeman Patent No. 1,813,732, it is our understanding that Paragraph VI entitled "Notice On Literature" does not place any restriction either on or Minneapolis-Honeywell Regulator Company on showing and describing in their respective advertising literature separate controls for use in a Freeman patented system if the company showing such separate controls does not have a "Combination Furnace Control" applicable to the system shown in such literature.

Yours very truly,

MINNEAPOLIS-HONEYWELL REGULATOR CO.

By _____
President.

Agreed:

We are in accord with the above interpretation of Paragraph VI entitled "Notice On Literature".

By _____

In connection with our license agreement to you under the Freeman Patent No. 1,813,73[illegible], we agree that so long as you do not sell separate heating medium temperature responsive controls for carrying out the system of the Freeman patent at a combined price which is less than 25% higher than the prices set forth in the Price Schedule of the agreement for any specific "Combination Furnace Control" comparable to carrying out in operation and function what the separate controls would do, we will not assert our rights against you or your customers under the Freeman Patent on account of such sales.

Yours very truly,

H. B. Sweatt - President.

HBS:med

License Agreement

Between

Minneapolis-Honeywell Regulator Company

and

AGREEMENT.

Agreement, entered into this ..... day of ....., 194..., by and between **MINNEAPOLIS-HONEYWELL REGULATOR COMPANY**, a corporation organized and existing under the laws of the State of Delaware and having a principal place of business at Minneapolis, Minnesota, hereinafter called "Licensor", and ....., a corporation organized and existing under the laws of the State of ....., and having a principal place of business at ....., ..., hereinafter called "Licensee";

WITNESSETH:

WHEREAS, Licensor is the owner of United States Letters Patent No. 1,813,732 granted to Edward E. Freeman on July 7, 1931; and

WHEREAS, Licensee is desirous of obtaining a certain non-exclusive license and right under said Freeman Patent No. 1,813,732;

NOW, THEREFORE, in consideration of the sum of One Dollar ($1.00) paid to the Licensor by Licensee, the receipt of which is hereby acknowledged and in consideration of the mutual representations, covenants and agreements herein set out, Licensor and Licensee mutually represent, covenant and agree as follows:

I. DEFINITION OF COMBINATION FURNACE CONTROL.

As used in this agreement, the expression "Combination Furnace Control" shall mean a unitary structure including at least a switching means for controlling not less than two circuits and operated by temperature responsive means responsive to the temperature of a heating device or the fluid medium heated thereby, one of said circuits being established on temperature rise and another being established on temperature fall, the structure having permanent internal wiring connecting the switching means to terminals for the connection of

external wires thereto, the internal wiring being so arranged that when the terminals are connected by external wires to a heat controlling mechanism or a combustion controlling mechanism for the heating device and to a means for controlling the circulation of the fluid medium heated thereby, such structure, when used as intended, embodies the system disclosed in and claimed by the Freeman patent No. 1,813,732. It being understood that this definition is not intended so far as said Freeman Patent is involved to limit the combinations in or with which said "Combination Furnace Control" may be used by Licensee or its vendees.

II. Grant.

Licensor hereby grants unto Licensee the non-exclusive right and license under said Freeman Patent No. 1,813,732 to make, use and sell said "Combination Furnace Control" throughout the United States, its territories and possessions, and to make and sell without any of the limitations or restrictions herein contained to any and all persons, firms or corporations, holding a license similar in scope to the license herein granted.

Subject to the terms and conditions hereinafter set forth, Licensor additionally grants unto Licensee under said Freeman Patent No. 1,813,732 the right and license to show and describe in its advertising and other literature complete systems of control covered by said Freeman Patent, except however, if Licensee has a "Combination Furnace Control" applicable to the system shown in such literature, then the Licensee shall show said "Combination Furnace Control" as an element thereof.

III. Royalties.

Licensee covenants and agrees to pay to Licensor an earned royalty of twenty-five cents (25¢) on each "Combination Furnace Control" sold by it.

For the sole purpose for computing royalty payments, "Combination

Furnace Controls" shall be considered as sold when billed out, or, if not billed out, then when delivered, or when paid for if paid for before delivery; but royalties paid on "Combination Furnace Controls" not accepted by the customer or returned for credit may be credited on future royalty payments.

IV. Records and Reports.

Licensee agrees to keep accurate records showing the number of "Combination Furnace Controls" sold by it during the continuance of this agreement and to render quarterly statements to Licensor on or before the fifteenth days of January, April, July and October showing the number of "Combination Furnace Controls" sold by it during the preceding three (3) months and further agrees to accompany each such statement by payment of the royalty thereby shown to be due Licensor.

Licensor shall have the right, through a certified public accountant, to inspect the books and records of Licensee pertaining to sales of "Combination Furnace Controls" in so far as may be necessary to verify the statements provided for herein, but such inspection shall be made during business hours and not oftener than once every three (3) months.

The certified public accountant making such inspection as herein provided for shall be agreeable to the Licensee and shall report to the Licensor the accuracy of the statements rendered by the Licensee from time to time. It is the intent of the Licensor and Licensee that the certified public accountant shall not disclose to the Licensor any business details which he may find in the Licensee's books while making such inspection and which are not necessary in determining the accuracy of the reports rendered by Licensee to Licensor.

V. Patent Marking.

Licensor and Licensee mutually agree that upon each of said "Combination Furnace Controls" sold they will place a nameplate, or a securely fastened tag or a cover insert, which nameplate, or tag or

cover insert shall carry upon it, among other things, the following information in clearly legible and reasonably sized lettering or printing:

> "Notice—This control is internally wired in a manner to shut down the heat source while permitting blower operation on furnace temperature rise and to stop the blower but permit operation of the heat source on temperature fall. This control and its use carries with it a license for one installation employing the sequence of operation embodying the invention of Freeman Patent No. 1,813,732."

VI. Notice on Literature.

Licensor and Licensee mutually agree that they will illustrate or describe the systems of control covered by the Freeman Patent No. 1,813,732 in their catalogues and installation literature only in connection with "Combination Furnace Controls" manufactured and regularly sold by them and that they will include in the copy of such literature and on the drawings or wiring diagrams thereof a statement to the following effect:

> "The Freeman Patent No. 1,813,732 covers systems of control in which upon rise in the temperature of a furnace or like heating device, the source of heat is reduced or shut down but the blower or other circulating means is permitted to operate, and in which upon fall in such temperature, the blower or other circulating device is stopped but the source of heat is permitted to heat the furnace or other heating device. This control is specially designed for carrying out the system of the Freeman Patent and its use carries with it a license for one installation employing the sequence of operation of the Freeman Patent No. 1,813,732."

Provided, however, that Licensee may distribute all catalogues and installation literature relating to said "Combination Furnace Controls" it may now have on hand and that in the event this agreement is terminated, Licensee shall have the right to continue to use said catalogues and literature it may have on hand at the termination of the agreement until the supply thereof is exhausted.

VII. Price Condition.

(a) The license granted herein to the Licensee is granted on the express condition that the prices, terms and conditions of sale of "Combination Furnace Controls" made in accordance with the terms of this agreement, shall be not more favorable to the customer than those fixed from time to time by Licensor for its own products embodying the invention covered by said agreement, and Licensee agrees to maintain such not more favorable prices, terms and conditions of sale as to said "Combination Furnace Controls." The prices, terms and conditions of sale shall be set forth in a schedule to be known as a "Price Schedule" and shall be issued from time to time by Licensor and form a part of this Agreement as though herein set out in full, and Licensee, after receiving a "Price Schedule" agrees that it will sell "Combination Furnace Controls" only at prices and on terms not more favorable to the customer than those set forth in said Price Schedule and in compliance with the general sales rules in said Price Schedule. A price schedule is hereto attached and marked "Price Schedule Exhibit A."

(b) Licensor shall give Licensee reasonable notice in writing of any and all proposed changes in said Price Schedule but not less than thirty (30) days' written notice shall be given before any change shall go into effect, and no such change shall operate against a bona fide order for "Combination Furnace Controls" to be delivered after the said change in price goes into effect, except that in no case shall delivery upon said bona fide order be made later than eleven (11) months after the change in price is effective.

(c) The spirit and intent of this license agreement contemplate that in no transaction shall there be, directly or indirectly, included any item or extra which shall have the effect of reducing the prices below those set forth in said Price Schedule as it exists from time to time as, for instance, by the inclusion in the transaction of other material or extras for increasing the value of the "Combination Furnace Control" or parts or labor or services at the prices computed in accord-

ance with the standard method of cost accounting used by Licensee for such extras plus the minimum price for the "Combination Furnace Control." No extras shall be included under any circumstance at a price for such extras at less than what said extras are sold at when sold with some other unit or control. Temperature indicating means to indicate the temperature at the thermal means of the "Combination Furnace Control" and a summer adjustment or locking means to provide fan operation only in the summer shall not be considered for the purpose of this agreement as an extra, nor shall size or shape of sensitive element, the addition of mounting fittings or the addition of an auxiliary terminal adaptor panel for converting a two wire installation into a three wire installation or vice versa be considered an extra for the purpose of this agreement.

VIII. Duration and Termination.

Unless earlier terminated, this agreement shall continue to the full end of the term of said Freeman Patent No. 1,813,732 and any extensions or reissues thereof.

Upon default of any of the conditions herein by Licensee, Licensor may inform the Licensee of such default in writing, and if such default be not remedied within sixty days thereafter by the Licensee, this agreement may be terminated by the Licensor at its election.

Licensee shall not have the right to terminate this agreement before the end of the calendar year 1940, but may cancel at any time thereafter by giving said Licensor a sixty (60) day notice in writing prior to the date of cancellation.

In the event Licensee does not place upon the market as one of its standard items a "Combination Furnace Control" within six (6) months of the execution of this agreement, or if after placing such a control on the market, Licensee ceases to distribute literature and manufacture and/or sell the same, then, in such event, Licensor may cancel this agreement by written notice sent to Licensee.

It is understood and agreed, that cancellation or termination of this agreement for any cause shall not relieve Licensee from the payment of any royalties which are due and owing to the Licensor at the time such cancellation or termination becomes effective.

IX. Binding Upon Successors.

This agreement and the covenants herein contained shall be binding upon the successors of Licensor and Licensee but the rights granted Licensee herein shall only be assignable by Licensee in connection with the sale of its entire business relating to the temperature control field.

X. Acknowledgment of Validity.

Licensee agrees to and does hereby acknowledge, during the life of this agreement, the validity of said Freeman Patent No. 1,813,732 under which this license is granted and agrees, during the life of this Agreement, that it will not deny or contest its validity or aid others in so doing.

Upon termination of this agreement, provided Licensee has complied with its obligations under the agreement up to the date of cancellation, the parties thereafter shall be in the same conditon as though this agreement had never been entered into.

XI. Equality of Terms.

Licensor hereby covenants and agrees that in the event it grants to another party a license similar in tenor and scope and having more favorable terms than this agreement, then in such event, Licensor will and hereby does extend to Licensee the same more favorable terms in this agreement. In the event of any additional granting of licenses or any change in any present Licensee's agreement, the Licensee herein shall be immediately notified of such additional license or change.

XII. No Other Rights Granted.

It is mutually understood and agreed that Licensee receives no licenses or right whatsoever under any other patents or applications owned or controlled by Licensor or under which Licensor has the right to grant licenses and rights, and that the limited license and rights hereby granted unto Licensee under the Freeman Patent No. 1,813,732 constitute the only license and rights which Licensee receives hereunder, impliedly or otherwise.

XIII. Waiver for Past Infringement.

Licensor hereby waives any and all claims that it may have against Licensee for past infringement of said Freeman Patent No. 1,813,732.

In witness whereof, the parties hereto have duly caused this instrument to be executed by their proper officers thereunto duly authorized on the day and year first above written.

Minneapolis-Honeywell Regulator Company,

By .....

Attest:

.....

.....

By .....

Attest:

.....

9

STATE OF MINNESOTA,
COUNTY OF HENNEPIN. } ss.

On this ..... day of ....., 194...., personally appeared before me, a Notary Public in and for the above mentioned County and State ..... and ....., personally known to me, who being by me duly sworn, on oath stated that they are President and Secretary, respectively, of Minneapolis-Honeywell Regulator Company; that they are authorized by the Board of Directors of said Corporation to execute the foregoing instrument; that the seal attached thereto is the seal of said Corporation, and that they executed said instrument as the free act and deed of said Corporation.

.....

Notary Public.

10

STATE OF ....., }
COUNTY OF ..... } ss.

On this ..... day of ....., 194...., personally appeared before me, a Notary Public in and for the above mentioned County and State ..... and ....., personally known to me, who being by me duly sworn, on oath stated that they are President and Secretary, respectively, of ....., that they are authorized by the Board of Directors of said Corporation to execute the foregoing instrument; that the seal attached thereto is the seal of said Corporation, and that they executed said instrument as the free act and deed of said Corporation.

.....

Notary Public.

1423 MERCOID EXHIBIT KK.

Copy

AGREEMENT.

Agreement entered into this 31st day of March, 1939, by and between Minneapolis-Honeywell Regulator Company, a corporation organized and existing under the laws of the State of Delaware and having a principal place of business at Minneapolis, Minnesota, hereinafter called "Licensor" and Cook Electric Company, a corporation organized and existing under the laws of the State of Illinois, and having a principal place of business at Chicago, Illinois, hereinafter called "Licensee",

Witnesseth:

Whereas, Licensor is the owner of United States Letters Patent No. 1,813,732 granted to Edward E. Freeman on July 7, 1931; and

Whereas, Licensee is desirous of obtaining a certain nonexclusive license and right under said Freeman Patent No. 1,813,732;

Now, Therefore, in consideration of the sum of One Dollar ($1.00) paid to the Licensor by Licensee, the receipt of which is hereby acknowledged and in consideration of the mutual representations, covenants and agreements herein set out, Licensor and Licensee mutually represent, covenant and agree as follows:

I. Definition of Combination Furnace Control

As used in this agreement, the expression "Combination Furnace Control" shall mean a unitary structure including at least a switching means for controlling not less than

1424 two circuits and operated by temperature responsive means responsive to the temperature of a heating device or the fluid medium heated thereby, one of said circuits being established on temperature rise and another being established on temperature fall, the structure having permanent internal wiring connecting the switching means to terminals for the connection of external wires thereto, the internal wiring being so arranged that when the terminals are connected by external wires to a heat controlling mechanism or a combustion controlling mechanism for the heating device and to a means for controlling the circulation of the fluid medium heated thereby, such structure, when used as intended, embodies the system disclosed in and claimed by the Freeman Patent No. 1,813,732.

II. Grant

Licensor hereby grants unto Licensee the non-exclusive right and license under said Freeman Patent No. 1,813,732 to make, use and sell said "Combination Furnace Control" throughout the United States, its territories and possessions.

Subject to the terms and conditions hereinafter set forth, Licensor additionally grants unto Licensee under said Freeman Patent No. 1,813,732 the right and license to show and describe in its advertising and other literature complete systems of control covered by said Freeman Patent, except however, if Licensee has a "Combination Furnace Control" applicable to the system shown in such literature, then the Licensee shall show said "Combination Furnace Control" as an element thereof.

III. Royalties

Licensee covenants and agrees to pay to Licensor an earned royalty of twenty-five cents (25¢) on each "Combination Furnace Control" sold by it.

1425 "Combination Furnace Controls" shall be considered as sold when billed out, or, if not billed out, then when delivered, or when paid for if paid for before delivery; but royalties paid on "Combination Furnace Controls" not accepted by the customer or returned for credit may be credited on future royalty payments.

IV. Records and Reports

Licensee agrees to keep accurate records showing the number of "Combination Furnace Controls" sold by it during the continuance of this agreement and to render quarterly statements to Licensor on or before the fifteenth days of January, April, July and October showing the number of "Combination Furnace Controls" sold by it during the preceding three months and further agrees to accompany each such statement by payment of the royalty thereby shown to be due Licensor.

Licensor shall have the right, through a certified public accountant, to inspect the books and records of Licensee pertaining to sales of "Combination Furnace Controls" in so far as may be necessary to verify the statements provided for herein, but such inspection shall be made during business hours and not oftener than once every three months.

V. Patent Marking

Licensor and Licensee mutually agree that upon each of said "Combination Furnace Controls" sold they will place a nameplate, or a securely fastened tag or a cover insert, which nameplate, or tag or cover insert shall carry upon it, among other things, the following information in clearly legible and reasonably sized lettering or printing:

1426 "Notice—This control is internally wired in a manner to shut down the heat source while permitting blower operation on furnace temperature rise and to stop the blower but permit operation of the heat source on temperature fall. This control and its use carries with it a license for one installation employing the sequence of operation embodying the invention of Freeman Patent No. 1,813,732."

VI. Notice on Literature

Licensor and Licensee mutually agree that they will only illustrate or describe the systems of control covered by the Freeman Patent No. 1,813,732 in their advertising, catalogues or other literature in connection with "Combination Furnace Controls" manufactured and regularly sold by them and that they will include in the copy of such literature and on the drawings or wiring diagrams thereof a statement to the following effect:

"The Freeman Patent No. 1,813,732 covers systems of control in which upon rise in the temperature of a furnace or like heating device, the source of heat is reduced or shut down but the blower or other circulating means is permitted to operate, and in which upon fall in such temperature, the blower or other circulating device is stopped but the source of heat is permitted to heat the furnace or other heating device. This control is specially designed for carrying out the system of the Freeman Patent and its use carries with it a license for one installation employing the sequence of operation of the Freeman Patent No. 1,813,732."

1427 VII. Price Condition

(a) The license granted herein to the Licensee is granted on the express condition that the prices, terms and conditions of sale of "Combination Furnace Controls" made in accordance with the terms of this agreement, shall be not more favorable to the customer than those fixed

from time to time by Licensor for its own products embodying the invention covered by said agreement, and Licensee agrees to maintain such not more favorable prices, terms and conditions of sale as to said "Combination Furnace Controls." The prices, terms and conditions of sale shall be set forth in a schedule to be known as a "Price Schedule" and shall be issued from time to time by Licensor and form a part of this Agreement as though herein set out in full; and Licensee, after receiving a "Price Schedule" agrees that it will sell "Combination Furnace Controls" only at prices and on terms not more favorable to the customer than those set forth in said Price Schedule and in compliance with the general sales rules in said Price Schedule. A price schedule is hereto attached and marked "Price Schedule Exhibit A."

(b) Licensor shall give Licensee reasonable notice in writing of any and all proposed changes in said Price Schedule but not less than thirty (30) days' written notice shall be given before any change shall go into effect.

(c) The spirit and intent of this License Agreement contemplate that in no transaction shall there be, directly or indirectly, included any item or extra which shall have the effect of reducing the prices below those set forth in said Price Schedule as it exists from time to time as, for instance, by the inclusion in the transaction of other material or extras for increasing the value of the "Com-
1428 bination Furnace Control" or parts or labor or services at the prices computed in accordance with the standard method of cost accounting used by Licensee for such extras plus the minimum price for the "Combination Furnace Control." No extras shall be included under any circumstances at a price for such extras at less than what said extras are sold at when sold with some other unit or control. Temperature indicating means to indicate the temperature at the thermal means of the "Combination Furnace Control" and a summer adjustment or locking means to provide fan operation only in the summer shall not be considered for the purpose of this agreement as an extra.

VIII. Duration and Termination

Unless earlier terminated, this agreement shall continue to the full end of the term of said Freeman Patent No. 1,813,732 and any extensions or reissues thereof.

Upon default of any of the conditions herein by Licensee, Licensor may inform the Licensee of such default in writing, and if such default be not remedied within sixty days thereafter by the Licensee, this agreement may be terminated by the Licensor at its election.

Licensee shall not have the right to terminate this agreement before the end of the calendar year 1940, but may cancel at any time thereafter by giving said Licensor a sixty (60) day notice in writing prior to the date of cancellation.

In the event Licensee does not place upon the market as one of its standard items a "Combination Furnace Control" within six months of the execution of this agreement, or if after placing such a control on the market, Licensee ceases to distribute literature and manufacture and
1429 sell the same, then in such event, Licensor may cancel this agreement by written notice sent to Licensee.

It is understood and agreed, that cancellation or termination of this agreement for any cause shall not relieve Licensee from the payment of any royalties which are due and owing to the Licensor at the time such cancellation or termination becomes effective.

IX. Binding Upon Successors.

This agreement and the covenants herein contained shall be binding upon the successors of Licensor and Licensee but the rights granted Licensee herein shall only be assignable by Licensee in connection with the sale of its entire business relating to the temperature control field.

X. Acknowledgment of Validity.

Licensee agrees to and does hereby acknowledge, during the life of this agreement, the validity of said Freeman Patent No. 1,813,732 under which this license is granted and agrees, during the life of this Agreement, that it will not deny or contest its validity or aid others in so doing.

XI. Equality of Terms.

Licensor hereby covenants and agrees that in the event it grants to another party a license similar in tenor and scope and having more favorable terms than this Agreement, then in such event, Licensor will and hereby does extend to Licensee the same more favorable terms in this Agreement.

XII. No Other Rights Granted.

It is mutually understood and agreed that Licensee receives no licenses or right whatsoever under any other patents or applications owned or controlled by Li-
1430 censor or under which Licensor has the right to grant Licenses and rights, and that the limited license and rights hereby granted unto Licensee under the Freeman Patent No. 1,813,732 constitute the only license and rights which Licensee receives hereunder, impliedly or otherwise.

XIII. Waiver for Past Infringement.

Licensor hereby waives any and all claims that it may have against Licensee for past infringement of said Freeman Patent No. 1,813,732.

In Witness Whereof, the parties hereto have duly caused this instrument to be executed by their proper officers thereunto duly authorized on the day and year first above written.

Minneapolis-Honeywell Regulator Company,
By Charles B. Sweatt,
Vice President.

Seal
Attest:
Charles C. Buckland,
Secretary.

Cook Electric Company,
By G. R. Folds,
President.

Attest:
C. E. Lundeen,
Seal Asst. Secy.

COPY

PRICE SCHEDULE - EXHIBIT A

Price Schedule forming a part of license agreement involving Freeman Patent No. 1,813,732.

MANUFACTURER

A manufacturer shall be defined as any firm manufacturing and marketing equipment with which Combination Furnace Controls are sold as an original part of, or necessary accessory to their product.

Manufacturer's Price.

The net minimum price for a Combination Furnace Control shall be . . . . . $ 5.25

The net minimum price for a Combination Furnace Control including a summer switch (manually operable on and off switch for the fan) shall be 5.65

The net minimum price for a Combination Furnace Control operable at two speeds shall be 7.50

The net minimum price for a Combination Furnace Control operable at two speeds including a summer switch (manually operable on and off switch for the fan) shall be 7.90

JOBBER AND WHOLESALER

A jobber or wholesaler shall be defined as a firm that handles Combination Furnace Controls primarily for the purpose of resale to contractors and dealers.

Jobber's or Wholesaler's Price

The net minimum price for a Combination Furnace Control shall be $6.19

The net minimum price for a Combination Furnace Control including a summer switch (manually operable on and off switch for the fan) shall be 6.75

The net minimum price for a Combination Furnace Control operable at two speeds shall be 9.00

The net minimum price for a Combination Furnace Control operable at two speeds including a summer switch (manually operable on and off switch for the fan) shall be 9.56

DEALERS AND OTHERS

Dealers and others shall be defined as all classes of customers not specifically coming within either the classification of a manufacturer or a jobber or a wholesaler as herein defined.

Dealers' and Others' Price

The net minimum price for a Combination Furnace Control shall be . . . . . $ 7.84

The net minimum price for a Combination Furnace Control including a summer switch (manually operable on and off switch for the fan) shall be 8.55

The net minimum price for a Combination Furnace Control operable at two speeds shall be 11.40

The net minimum price for a Combination Furnace Control operable at two speeds including a summer switch (manually operable on and off switch for the fan) shall be 12.11

These prices shall become effective not later than thirty (30) days after the execution of the contract of which this Price Schedule forms a part.

J. BERNHARD THIESS
ARTHUR A. OLSON
A.T. MECKLENBURGER
WILLARD L. POLLARD
GEORGE W. HANSEN
A. ARNOLD BRAND
THORLEY VON HOLST
BERTRAM AM COLTMAN
ALBERT H. PENDLETON
CARL MARX
ARTHUR B. SEIBOLD JR.
SIDNEY NEUMAN

S. GORDON ALLER
W. HUDSON RATHBURN
ROBERT W. POORE
BENTON A. BULL
C. BAXTER WARNER

WILBUR A. OLSON
CHESTER E. WARNER
FRED T. WILLIAMS
PATENT AGENTS

THIESS, OLSON & MECKLENBURGER

ATTORNEYS AND COUNSELORS

77 WEST WASHINGTON STREET

CHICAGO

TELEPHONE CENTRAL 0800
CABLE ADDRESS "NATIONAL" LEGAL CODE
GENERAL PRACTICE
PATENT TRADE MARK COPYRIGHT

WALTER CLYDE JONES
1908-1928
KEENE N. ADDINGTON
1908-1932
ARTHUR B. SEIBOLD
1908-1932 RETIRED

ROBERT LEWIS AMES
ASSOCIATE COUNSEL

July 1, 1941.

MERCOID EXHIBIT MM

Mercoid Corporation,
4201 Belmont Avenue,
Chicago, Illinois.

Attention Mr. I. E. McCabe.

Dear Mr. McCabe:

Confirming our conversation of June 23, 1941, we call attention to U. S. Letters Patent No. 2,230,446 granted to John S. Baker February 4, 1941, and assigned to the Cook Electric Company, and the manufacture and sale of controls by you that make you liable as a contributory infringer of this patent. Specifically we call attention to the lower left-hand illustration and description on page 9 of your catalog No. 400, entitled Mercoid Automatic Controls. There may be other controls that will also result in contributory infringement, but for purposes of this notice, we refer to page 9 of said catalog. You are naturally better acquainted with what you manufacture than we are and know for what purposes your products are sold.

You are apparently laboring under an erroneous impression that the Cook Electric Company is attempting to use

this patent to obtain a limited monopoly on what you say are unpatented products. To this we do not agree. We merely say that we have been authorized to institute suit for contributory infringement in and when you make a control that is to be used or is used to practice the invention covered by this patent. As a matter of fact, the Cook Electric Company does not make controls of the type in question, nor does it offer them for sale to the trade.

Under the authorities, our client has a right to hold you for contributory infringement. See B.B. Chemical Co. v. Ellis, et al., 48 U.S.P.Q. 487 (C.C.A.1, 1941) and cases therein referred to, including the Carbice, Barber Asphalt and Ethyl Gasoline cases of the United States Supreme Court.

You ask us to point out the claims of this patent we believe you infringe. Without more comprehensive knowledge of your manufacture in this type of control, we call attention to claims 39, 40, 41, 45 to 48, incl., 54, 55, 56, 66, 67, and 68.

The scope of disclosure of this patent will also be noted by referring to claims 44, 50, 51, 52 and 53 covering summer-winter control in connection with variable capacity of operation of the blower, and claims 62, 63 and 64 covering high-low fire control.

We would appreciate your early consideration of this matter and suggest a conference next week.

Yours very truly,

THIESS, OLSON & MECKLENBURGER

By

BMC:TS

MINNEAPOLIS-HONEYWELL REGULATOR CO.
EXECUTIVE OFFICES
MINNEAPOLIS, MINNESOTA, U. S. A.
FACTORIES MINNEAPOLIS, MINN
WABASH, IND.

W. L. HUFF
VICE PRESIDENT
AND
TREASURER

SUBSIDIARIES
THE BROWN INSTRUMENT CO
PHILADELPHIA, PA
MINNEAPOLIS-HONEYWELL REGULATOR CO LTD,
TORONTO, CANADA
N. V. NEDERLANDSCHE
MINNEAPOLIS-HONEYWELL CO
AMSTERDAM, HOLLAND
HONEYWELL-BROWN, LTD
LONDON, ENGLAND
HONEYWELL-BROWN, AB
STOCKHOLM, SWEDEN

June 21, 1940

Mr. Ira E. McCabe
Mercoid Corporation
4201 West Belmont Avenue
Chicago, Illinois

Dear Ira:

The question of your company taking a license under the Freeman Patent has been dragging along, as you know, over a period of several months. In view of your failure to reach a decision on the matter, we have no choice but to enter suit, and this we expect to do on July 1st. I am sure that you can appreciate our position in the situation and that every opportunity has been given to you to accept the license under this patent, and that the necessity for our filing suit is the result of the necessity to be fair to our other licensees and to ourselves in this present price situation.

Very truly yours,

MINNEAPOLIS-HONEYWELL REGULATOR CO.

W. L. Huff

W. L. Huff, Vice-Pres. & Treasurer

WLH/mr

MERCOID EXHIBIT QQ

June
Twenty-eighth
1 9 4 0

Minneapolis-Honeywell Regulator Company
Minneapolis,
Minnesota

Attn: Mr. W. L. Huff,
Vice-President & Treasurer

Dear Mr. Huff:

Your letter of June 21, 1940 addressed to the Mercoid Corporation, attention: Mr. Ira E. McCabe, has been referred to me for acknowledgment and reply.

The reason why this matter has dragged along is that Mercoid has been loath to take a license under the Freeman Patent No. 1,813,732, because as Mercoid interprets this license, Mercoid would pay a royalty upon every patented Mercoid fan or limit control sold by it whether or not adapted by the purchaser in an installation such as described in the Freeman Furnace Control Patent. Also, under this license, Mercoid would agree to control the sale price of such Mercoid instruments, and this we have been advised is not in accordance with the law.

Furthermore, from our knowledge of the prior patents and prior public uses, Mercoid denies the validity of said Freeman Patent, and further Mercoid does not sell nor install a complete apparatus for a Furnace Control as disclosed and claimed in the said Freeman Patent. Mercoid denies that the sale of its patented fan or limit control which may be adapted for use by a purchaser in a Furnace Control as claimed in the said Freeman Patent, in any way infringes or contributes to the infringement of the said Freeman Patent No. 1,813,732.

Yours very truly,

THE MERCOID CORPORATION

H.Courteol/G
Registered Mail

President

MERCOID EXHIBIT RR

MINNEAPOLIS-HONEYWELL REGULATOR CO.
EXECUTIVE OFFICES
MINNEAPOLIS, MINNESOTA, U. S. A.
FACTORIES: MINNEAPOLIS, MINN.
WABASH, IND.

L. HUFF
PRESIDENT
AND
TREASURER

SUBSIDIARIES
THE BROWN INSTRUMENT CO.
PHILADELPHIA, PA.
MINNEAPOLIS-HONEYWELL REGULATOR CO. LTD.
TORONTO, CANADA
N. V. NEDERLANDSCHE
MINNEAPOLIS-HONEYWELL CO.
AMSTERDAM, HOLLAND
HONEYWELL-BROWN LTD.
LONDON, ENGLAND
HONEYWELL-BROWN A/B
STOCKHOLM, SWEDEN

October 7, 1940

Mr. Ira E. McCabe
Mercoid Corporation
4201 Belmont Avenue
Chicago, Illinois

Dear Mr. McCabe:

It has just been called to my attention that with my letter of May 7, 1940 addressed to you a letter was enclosed having reference to certain units selling at a price "less than 25% higher than the prices set forth in the price schedule of the agreement for any specific Combination Furnace Control." I now find that the term "25%" was a typographical error. It should have been "25¢" (twenty-five cents). I regret this error.

Very truly yours,

MINNEAPOLIS-HONEYWELL REGULATOR CO.

W. L. Huff, Vice-Pres. & Treasurer

WLH/mr

MERCOID EXHIBIT 88

SAN MATEO PHONE 88 SAN FRANCISCO PHONE DOUGLAS 1180 PALO ALTO PHONE 68

PENINSULA BURNER AND OIL CO.

888 HARRISON STREET SAN FRANCISCO

January
14
1926

MERCOID
EXHIBIT
CCC

Federal Gauge Co.,
564 W. Adams Street,
Chicago.

Gentlemen:

We have just figured a hot air furnace job in which we will have to use a booster fan. This fan, in our opinion, should be a actuated by the furnace itself and should come into action after the furnace has been heated, that is to say, sometime after the fire actually starts.

The problem is, therefore, to get a furnacestat of standard voltage such as shown on page 22 of the Honeywell catalogue. If you have such an instrument, kindly send us one and we will submit it to the Architect of the job for approval.

Very truly yours,

PENINSULA BURNER & OIL CO.

By W. L. Dreyfus
W. L. Dreyfus

M17518

Peninsula Burner & Oil Co.,
Mr. W. L. Dreyfus,
805 Harrison Street,
San Francisco, Calif.,

January 19, 1926

Gentlemen:-

We have your favor of the 14th regarding a hot air furnace job hook-up with a booster fan, and would advise, that our Figure 50 furnace control as shown on Bulletin 8-2 enclosed, may be used for this purpose. It will be necessary for you, however, to advise us the point at which this instrument is to cut in and start the motor, and at what point you desire it to cut out.

Immediately upon receipt of this information, we shall arrange for prompt shipment.

M17518

Yours very truly,

JWC:S
Enc.

VICE PRESIDENT

SAN FRANCISCO PHONE DOUGLAS 1166 | PALO ALTO PHONE 642

PENINSULA BURNER AND OIL CO.

694 HARRISON STREET SAN FRANCISCO

January
23
1926

Federal Gauge Co.,
564 W. Adams St.,
~~San Fran~~ Chicago.

M 17518

Gentlemen:

Referring to our request for a control such as shown on your bulletin 32 figure 50, please be advised that it is our intention to use this instrument in connection with a booster fan and its purpose is to start the fan after the furnace has attained sufficient heat to prevent cold air being blown into the house and to stop the fan at such a time after the burner quits operating that the temperature falls so low in the furnace that it is no longer desirable to have the [illegible] running. The writer is satisfied, after speaking with your Mr. Matthews, that your figure 50 with a reversed tube will accomplish this job, and urges that one be forwarded immediately by parcel post.

Referring back to Mr. Matthews' visit here--the concerns such as ours, remote from your factory and service, undoubtedly derive great benefit from such visits and we most heartily commend your judgement in sending him along to help us out of our troubles. Trusting that we will from time to time be further favored with visits from your factory we are

Very truly yours,

PENINSULA BURNER & OIL CO.

M 17518

BY
PH W. L. Dreyfus.

M 17518

3/4

Peninsula Burner & Oil Co.,
Mr. . . . Dreyfus,
235 Harrison Street,
San Francisco, Calif.

January 2-, 1926.

Dear Sir:

Referring to your order of January 23rd, please note that our engineering Department recommends sending you two (2) controls, one set 100° to 140°, and the other one 250° to 300°, the first instrument to be set to cut in when the temperature in the dome of the furnace reaches 200°, and remain in contact until the temperature has dropped to 140°.

This instrument will withstand a maximum temperature of 350° without damage. At 340° the question of fire hazard arises due to the accumulation of lint and dust in the air ducts and around the registers. For that reason our engineering Department recommends sending you the second instrument as a safety limiting device set to cut in at 250° and out at 300° which will afford protection not only for the fan controlling instrument but also against the fire hazard.

If you do not want the second instrument, please return it to us for credit.

We thank you for your specifications and appreciate your kind reference as to our responsibleness.

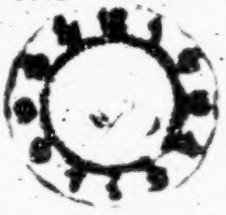
Yours very truly,

JAN 89 1926
23669

THE FEDERAL GAUGE CO. INVOICE

Delivered [illegible]
ON FEB 1 1926

MERCOID ORDER.



JA 2 19

From Peninsula Burner & Oil Co.,
865 Harrison St.,
San Francisco, Calif.

Ship above,

Date 1-[illegible]-26

Cust. Ord. No 1-1-[illegible]
and 1-1-14-26

Cust. Req. No M17518

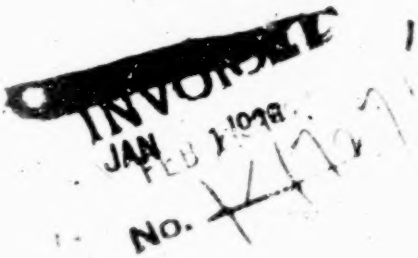
Our Ord. No

Via Parcel Post Mark Package

1 3A Furnace control, 200-1400
LC 03 dn. for Boston Furn.

1 3F Furnace control, 200-3000
LC 0B HR.

prom. 2-3-26



1 carton 16#
postage $1.04

[illegible] SECOND STREET — TELEPHONE [illegible]

MILLER AUTOMATIC SERVICES

DOMESTIC AND COMMERCIAL

Oil Heating, Water Softening and Electric Refrigeration

FOND DU LAC, WISCONSIN

10/20

October 1o, 1930

MERCOID EXHIBIT DDD

General Sales Company
[illegible] West Adams Street
Chicago, Illinois

Gentlemen:

We have in mind an oil fired hot air job in a church which uses a blower system to force the hot air into the church.

The blower is equipped with a 220 volt, 3 phase, 2½ horse power motor. We would like to equip this job with an air-stat in the top of the furnace so that the blower would automatically start when the temperature got up to a certain point and would automatically stop when the temperature in the hot air duct dropped to a pre-determined point.

If you can furnish us such equipment, please advise us and quote us prices.

Yours very truly,

MILLER AUTOMATIC SERVICES

BY [signature]

ALC

iller Automatic Services,
r. Ralph E. Miller,
eventeen East Second St.,
ond Du Lac, Wisconsin,

October 20, 1926

Gentlemen:-

We have your favor of the 18th and are pleased to enclose copy of our Bulletin E-8, and would advice, that we are in a position to furnish our Figure 80 furnace control, set to cut in at 190°, and capable of withstanding a temperature of 300°, and to cut out at 140°, for use in connection with a starting switch to operate the blower motor, in the event that this motor is going to be larger than 1 H.P.

The list price of this control is $89.00, less the discount of 33-1/3%.

We would recommend, in addition to using the furnace control for starting and stopping the motor driven fan, that you employ a furnace control set to cut out at not over 300° temperature in order to protect the fan control and the installation itself from over heating.

We are in a position to make immediate shipment from Chicago stock.

We trust this gives you the desired information, and remain

Yours very truly,

VICE PRESIDENT

J O:DS
nc.

90839

MILLER AUTOMATIC SERVICES.
DOMESTIC AND COMMERCIAL
Oil Heating, Water Softening and Electric Refrigeration
FOND DU LAC, WISCONSIN

October 23, 1936

[illegible]
204 West Adams Street
Chicago, Illinois

[illegible]

We-se'ect as one figure 5c furnace control set to cut in at 130° and cut out at 140°, this control to be capable of withstanding a temperature of 400°.

These specifications are in accordance with your letter of October 20, 1936. We have gotten information from the Dreyber Electric Co[illegible], and they recommend their catalog number CR7005-A4 enclosed magnetic starter for use in connection with a 1 H.P., 3 phase, 220 volt, 60 cycle motor, with your furnace control.

If you are familiar with this Dreyber switch and it is not the correct one for us to use, please advise us at once.

Yours very truly,

MILLER AUTOMATIC SERVICES

BY Ralph E. Miller

November 23, 1926

aller Automatic Services,
nd Du Lac,
isconsin

ttention - Mr. Ralph E. Miller

ar Sirs:

In reply to your letter of November 13th, we have from e factory a promise of shipment for the 18th on the control specified in e first paragraph of your letter. While we use Figure 50 on this we ually refer to the instrument as a Booster Fan Control due to the fact t the installation is usually made for forced circulation of air in con- tion with a hot air installation. The solder used in the construction this instrument will stand up to 350° of heat and the operation of the trument is as follows:-

When temperature surrounding the dome of a hot air in- llation reaches to 190° this control cuts in and starts the circulating , then if for any reason the fire should go out and the temperature rounding the dome be reduced to 140° or less, the instrument will cut , thus preventing the forced circulation of cold air through the ventil- ng ducts.

We usually recommend the use of a limiting device with e use of the circulating fan, such as our Figure 50 Furnace Control set 250 to 300° the purpose of this being to prevent overheating of the rnace dome and also due to the fact that at 340° there arises a fire haz- such as the taking fire of lint and dirt which may have accumulated in ventilating ducts. As to the necessity of this Control, you are in the t position to judge.

The magnet starter referred to in the second paragraph your letter will be entirely satisfactory for use with our control. If any time we can give you further information or blue prints or wiring grams which will be useful to you in connection with your installations, will only be too glad to forward them upon request from you, and our En- eering Department will be glad to assist you with constructive suggest- ns or in connection with any problems which may arise. We are at your vice upon request.

Yours very truly,
THE FEDERAL GAUGE COMPANY

VB

Order Department

April 22, 1927

Premier Warm Air Heater Co.,
Dowagiac, Michigan

Attention - Mr. L. W. Coller

Dear Sirs:

In reply to your letter of April 20th perhaps an explanation of the functions of the Figure 50 Furnace Control will assist you to a better understanding of its operation. The range 250 to 300 degrees represents a safety - preventing the burner from operating to produce a temperature higher than 300 degrees surrounding the dome. At a point approximately 240 to 250 degrees Fahrenheit there arises a fire hazard due to the inflamability of lint and dust which may have collected in the air ducts. This then puts the Figure 50 in the position of a limiting device.

For forced circulation by means of booster fans we make a similarly constructed Control but instead of cutting in at the low and out at the high - the operation is just the reverse, the range being between 140 to 200 degrees. This instrument will not cut-in and start the booster fan until the temperature surrounding the dome has reached approximately 200 degrees, thus preventing the blowing of cold air through the ducts before the furnace has heated up to a point sufficient to furnish the necessary warm air. If for any reason the burner stops or the flame goes out when the temperature surrounding the dome drops to 140 degrees, this Control will cut out and stop the booster fan again preventing the blowing of cold air through the circulating ducts.

We believe this latter Control, known as the Figure 50 Booster Fan Control, will better meet your requirements. If possible, we suggest the use of both - the former as the limiting device and the latter as the fan Control. Have we made ourselves entirely clear to your satisfaction.

Yours very truly,

THE FEDERAL GAUGE COMPANY

MERCOID EXHIBIT EEE

Order Department

KMMo:VB

MERCOID EXHIBIT FFF

December 20, 1927

Socony Burner Corp.,
300 Central Ave.,
Albany, N.Y.,

Gentlemen:- Attention - Mr. R. C. Busch, Eng.

At the request of our special representative, Mr. A. W. Barr, we are enclosing copy of our heating catalog, and wish to call your attention to our Figure 50 furnace control which we are in a position to furnish with the special range for booster fan application. This control when used for this work is supplied with a range of 190 to 140°, cutting in at the high point and breaking the circuit on a drop in temperature to 140°. The expansion element or bourdon tube is capable of withstanding a maximum temperature of 350°.

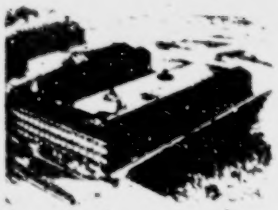
We recommend in each and every instance where a booster fan control is supplied, that a regular Figure 50 furnace control be also used as a limiting device, set to cut out when the temperature in the hood above the dome reaches the temperature of 300°, restoring the circuit on a drop in temperature to 250°.

Trusting that we may have an opportunity of serving you, and thanking you for the courtesies shown our representative, we remain

Yours very truly,

JWO:DS
Encl.

VICE PRESIDENT



The XX Century Heating & Ventilating Co.

REGISTERS RADIA... AND PATENT CASING RINGS

REPRESENTED BY
A. D. CURRENS
PHONE 5452

124 THE DRIVE
TOPEKA, KANSAS

September 10, 1928.

The Mercoid Corporation,
Chicago, Ill.

Gentlemen:

Noticed your advertising on Furnace Control #50 in Fuel Oil under date of September 1928.

I would like to give you the following illustration of a job which happens to be in my own home. I have an OIL-O-MATIC Burner installed as I formerly was the OIL-O-MATIC Dealer in this City and have used quite a number of various types Mercoid Controls but I have a different problem.

I have the old style burner installed which uses Minneapolis IRV thermostat. I am using Honeywell Mercury IRV Stack switch for safety. I have often had the experience with an old thermostat of the points sticking and failing to cut off the burner, however I now have installed a new IRV. Thermostat and this may happen again. I want to eliminate extra high temperature inside the casing in that event, and need an extra control for this purpose, and wondered if you have this #50. for this purpose to be hooked in series with the motor of the burner or in one side of the line, along with a Mercoid control which will give the control on a Miles Automatic Furnace Fan which I have installed on this job. I do not want the fan to come on as soon as the burner or account of the air feeling cold. I want the Fan to come on when the proper temp is reached inside the casing and continue to operate until Furnace has cooled down to a certain point. Do you have any dual controls for this purpose of the type specified for warm air Furnace installations. If so, what is the number of the control and the list price or list with present discount. Please send descriptive literature covering requirements and also advise if it is necessary to use two of these controls to accomplish desired results.

Thanking you for an early reply, I am.

Yours very truly,

P.S. My Fan is now hooked on separate Circuit with Oil Burner and would as soon operate it separately from Burner Circuit

10/23

Sept. 14, 1928.

The 20th Century Heating & Ventilating Co.,
R. H. Currens, Representative,
124 The Drive,
Topeka, Kansas.

Dear Sirs:-

HONEYCOMB CONTROLS:

Your favor of September 10th has been noted and in response we wish to state that we could furnish our Fig. 50 Control, with standard range 200 to 300°F., mounted in the drum of the furnace and connected in the line ahead of all other controls. Please note our catalog.

Regarding the furnace fan, the same type of control is used, but with a range 190 to 140°, to cut in at high and off at low. The fan will not start until the dome reaches a temperature of 190° and will continue to run after the burner is off until the temperature in the dome drops to 140°, thus using the latent heat of the furnace. This latter control would be connected in series with the line and fan motors.

Both these controls list at $27.00 and we quote you a discount of 40%.

Refer you to page 33 of the enclosed catalog.

We are glad to have you consult us freely and we trust the above will give you the desired information.

Yours very truly,

THE HONEYCOMB CORPORATION

WHL
Enc.

SALES ENGINEER

HOLLAND FURNACE COMPANY

WORLD'S LARGEST INSTALLERS OF FURNACES

Our Product

The Heart of the Home

HOLLAND MICHIGAN

Beloit Wis.
Jan.11th.1929.

The Mercoid Corporation
564 West Adams St.
Chicago Ill.
Gentlemen :

We have a # 50 Holland installed which is using a Williams Oil-O-Matic Burner and is equipped with your Mercoid Thermostat.

We want to install our Aire-U-Well fan in this furnace to distribute heat to the long pipes ; and want a switch to start the fan after the temperature in the casing or hood has reached a high point , and to continue to run untill the burner has shut off and all the heat made is delivered to the rooms.

This fan operates on 110 Volts A.C. Current and we want to know if it can operate from the same circuit as the Thermostat or must be entirely separate.

Will your Furnacestat or limit control operate the fan as we wish ?

We will be pleased to receive your Catalog and whatever information you can give us.

Yours truly
T.B.Moore.
Holland Furnace Co.
Beloit Wis. Branch
410 Broad St.

dealers 40%

January 1 , 1929

Holland Furnace Company,
Beloit, Wisconsin.

HERROID & HERROLD:
Gentlemen:- Attention - Mr. T. B. Moore

We have your favor of January 11th, and are pleased to advise we are in a position to furnish for the installation mentioned, our Figure 5 Herroid Warm Air Furnace Fan Control. This instrument is illustrated and described on page 23 of our heating control catalog, copy of which we are enclosing. Our standard range for this work is 190 to 140°, cutting in at the high point to start the fan motor and cutting out when the dome temperature drops to the low point.

This control should be wired independent of the Thermostat circuit in order for it to operate satisfactorily.

The discount from list prices shown in our catalog is 40%, and in lots of 12 or more, 40-5%.

Thanking you for your inquiry, and hoping that we may have an opportunity of serving you, we remain

Yours very truly,

THE HERROID & RPORATION

BFH:DS
Encl.

B. F. Herb, Jr. - Sales Engr.

MERCOID EXHIBIT III

J. A. PORTNER

DISTRIBUTOR OF

ELECTROL

THE AUTOMATIC OIL BURNER

ELECTRICAL CONTRACTING
MOTORS AND SUPPLIES
ELECTRICAL REFRIGERATION
OIL BURNING EQUIPMENT FOR ALL PURPOSES
WATER SUPPLY EQUIPMENT
WATER SOFTENERS AND HEATERS
GARBAGE INCINERATORS

WHEATON, ILLINOIS

Nov 22-28.

Mercoid Corp.,
Chicago, ILL.
L.H.VanDese.

Dear Van:

Inclosed you will find proposed control scheme for the heating plant in my new show room, office and shop building now under construction. Can you furnish the thermostat in two circuit?

The building will be 24 ft front by 132 ft deep, front [illegible] ft show room, then 20 ft for offices and toilets, then 46 ft shop and rear 26 ft garage and storage.

I will use a Ledger Cool-Stack Boiler and two 100,000 BTU unit heaters, one for the shop and the other for the show room and offices. The [illegible] shown will give me absolutely independant control of the two conditions and fully automatic. The 32 shown is for [illegible] and hot service indirectly through an Excelso heater.

Check this [illegible] let me have your suggestions and dont forget that when one sold cash customerie buying for his own use that it is customary to get a better price.

Thanking you for any suggestions I am

Yours truly,

J. A. Portner

VN-JP

I'll [illegible] mercoid Thermostat [illegible] Fig 2 to [illegible] 6 wire set at 0-2# pressure. When [illegible] contacts close at [illegible] on [illegible] and will take care of [illegible] as per Fig 1 & 2. Mercoid instructions Fig 1 & 2

MEMBER AMERICAN OIL BURNER ASSOCIATION

J. A. PORTNER

SALES, SERVICE AND
ACCOUNTING DEPTS.
N. WHEATON AVE.

PHONE WHEATON 508

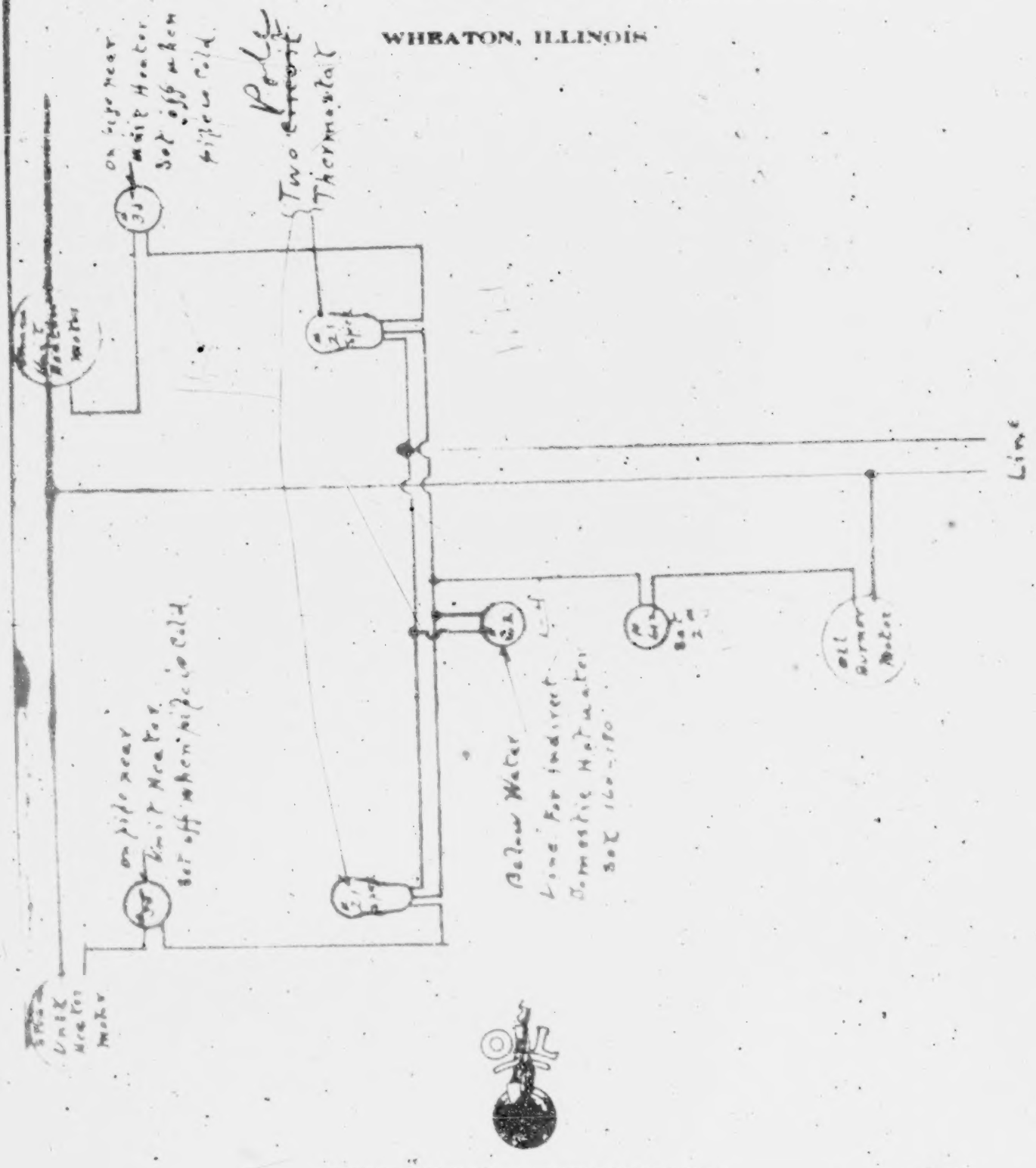
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ELECTROL

THE AUTOMATIC OIL BURNER

ELECTRICAL CONTRACTING
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OIL BURNING EQUIPMENT FOR ALL PURPOSES
WATER SUPPLY EQUIPMENT
WATER SOFTENERS AND HEATERS
GARBAGE INCINERATORS

WHEATON, ILLINOIS



MEMBER AMERICAN OIL BURNER ASSOCIATION

THE MERCOID CORPORATION

554 WEST ADAMS STREET
CHICAGO

N

INVOICE NO

CHARGE TO J A PORTNER

ORDER NO 7945

DATE OF INV JAN

901 N WHEATON AVE
WHEATON
ILL

CUST NO MAY

DATE SHIPPED

SHIPPED TO ABOVE

ENTERED 1-3-29

TERMS

THIS INVOICE IS PAYABLE AT PAR IN NEW YORK OR CHICAGO FUNDS

SHIPPED FROM CHICAGO VIA EXPRESS

QUANTITY	SIZE	ITEM	PRICE	AMOUNT	EXTENSION	TAX
1		MERCOID FIG.71 COMB SINGLE POLE SINGLE CIRCUIT 1 TO ~~14~~ PRESS CONTROL AND LOW WATER CUTOFF				
3		MERCOID FIG 35 SINGLE POLE SINGLE CIRCUIT ~~140~~ TO200 DEGREE RISERTHERM				
2		MERCOID 845-23~~0~~ FIG 21 DOUBLE POLE SINGLE CIRCUIT 56 80 DEGREE HTG THERMO				
1		ADJUSTABLE CONNECTION BAR 2 1/4 INCH LENGTH FOR FULL AUTOMATIC OPERATION				
1		DITTO 2½ INCH LONG				

NET LOT

TOTAL DUE

MERCOID EXHIBIT KKK-1

J. A. PORTNER

225 W. FRONT ST.

WHEATON, ILLINOIS

Copeland

DEPENDABLE Refrigeration

For those who want the finest

Dear Friend:

This is an announcement of the opening of our new show room and shop, at 225 W. Front St. This is more significant than just the opening of another store in town.

Our new building is 24 x 132 ft. and is the best equipped building for its purpose in DuPage Co., if not in the State of Illinois. This was made possible by the public's acceptance of two home comforts that were practically unheard of eight years ago, namely Domestic Electrical refrigeration and full automatic oil heating. Both have grown to be major industries in these brief few years.

Other than the two services mentioned we will display water softeners, pumps, water heaters, garbage incinerators, ventilating fans, oil burning boilers, and many other home comforts and labor-saving devices.

We have been in business in Wheaton for nineteen years and have demonstrated to our satisfaction that good merchandise, prompt and intelligent service and good will are the necessary elements to attract and hold the public's confidence.

We thank our many friends for their patronage and especially invite them to call and inspect our new store.

Yours very truly,

Walter

MERCOID EXHIBIT [illegible]

March 5, 1929.
(Dict. 3-4-29)

Mr. J. [illegible] Portner,
2[illegible] Front St.,
Wheaton, Ill.

Dear Jack:

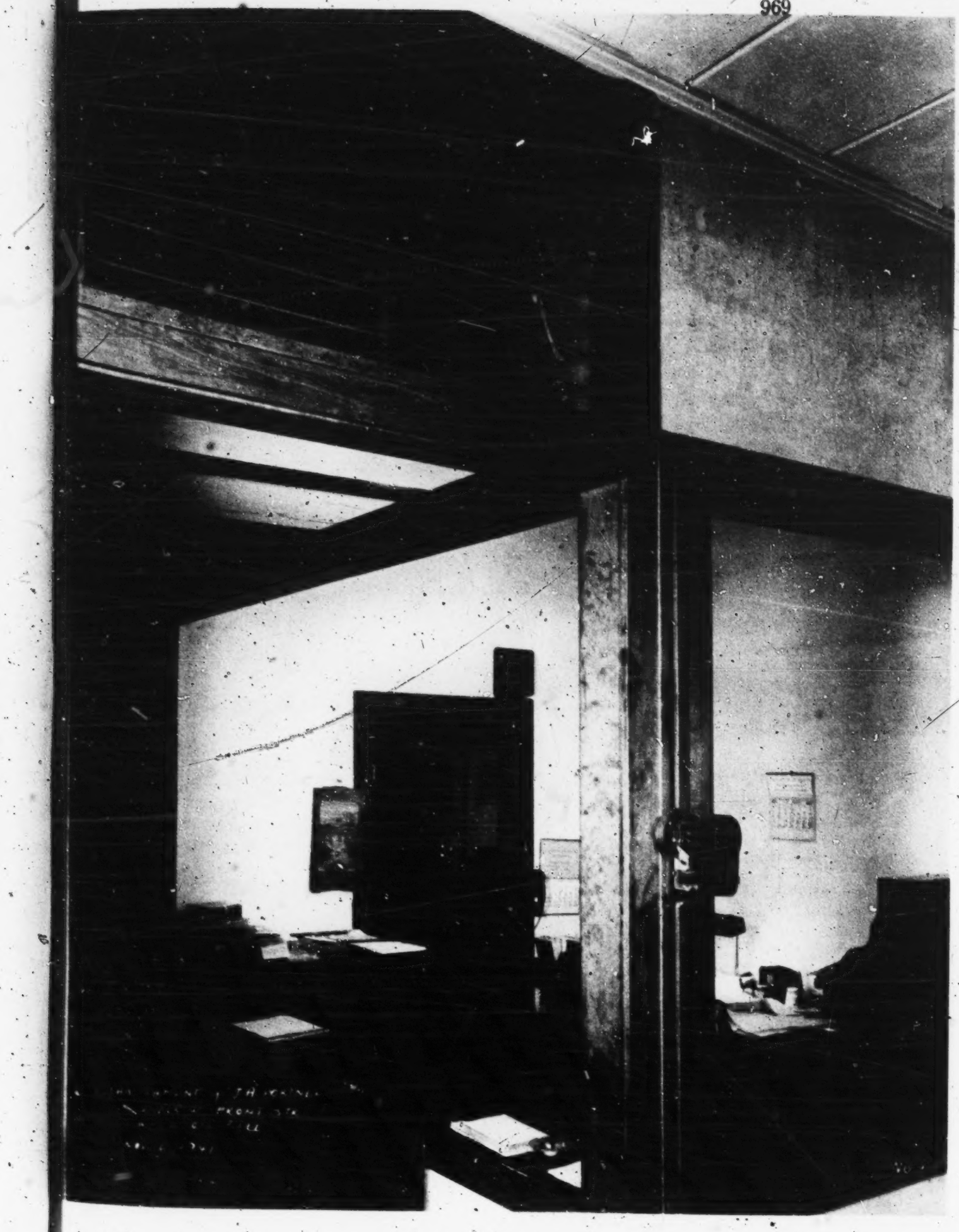
Congratulations, please, upon your announcement which came in this morning. It is certainly gotten up well, and I hope the Copeland people paid for it, as I observe no reference to oil burners.

You are certainly doing a worth-while job, and I am all for you.

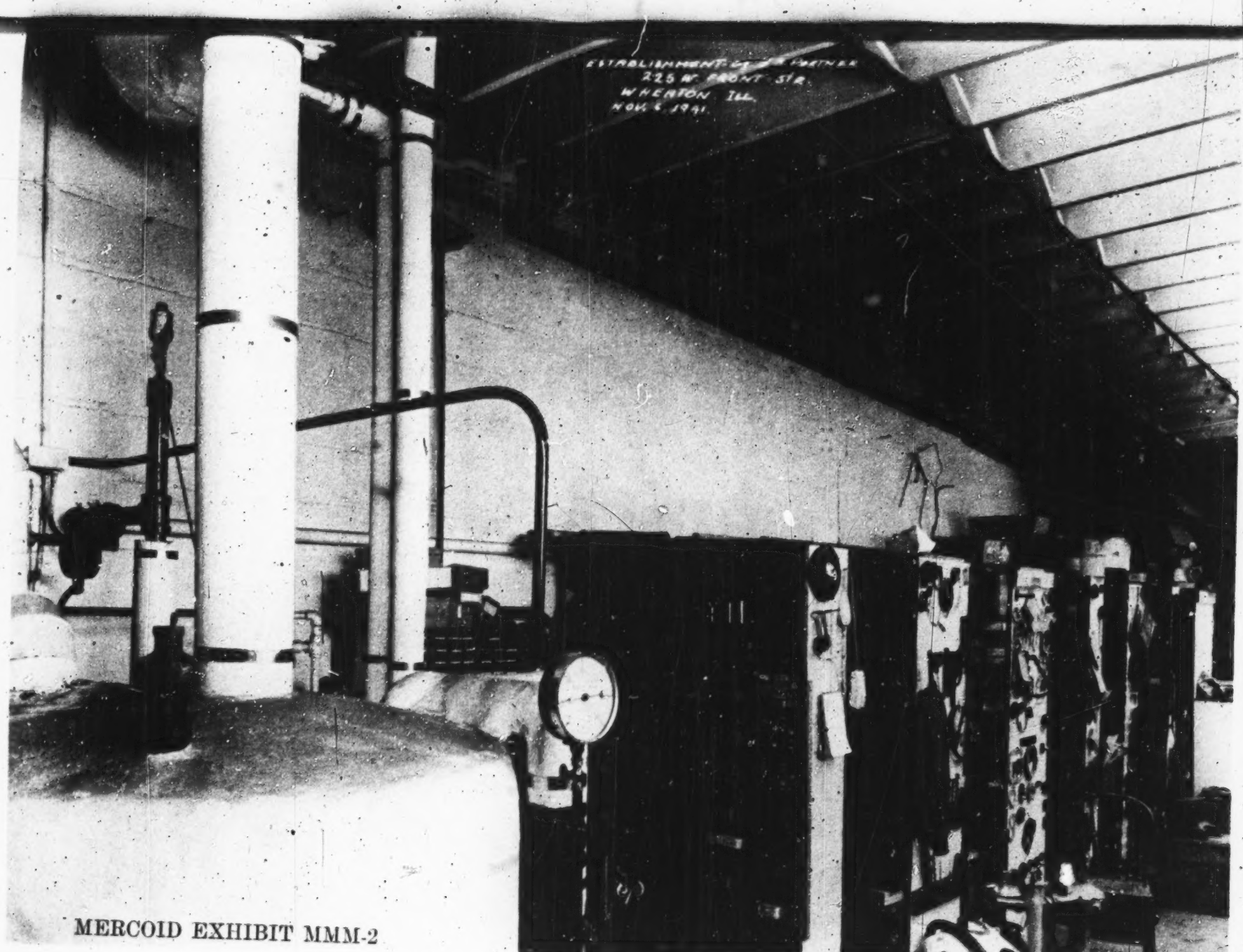
Best wishes, always.

Sincerely,

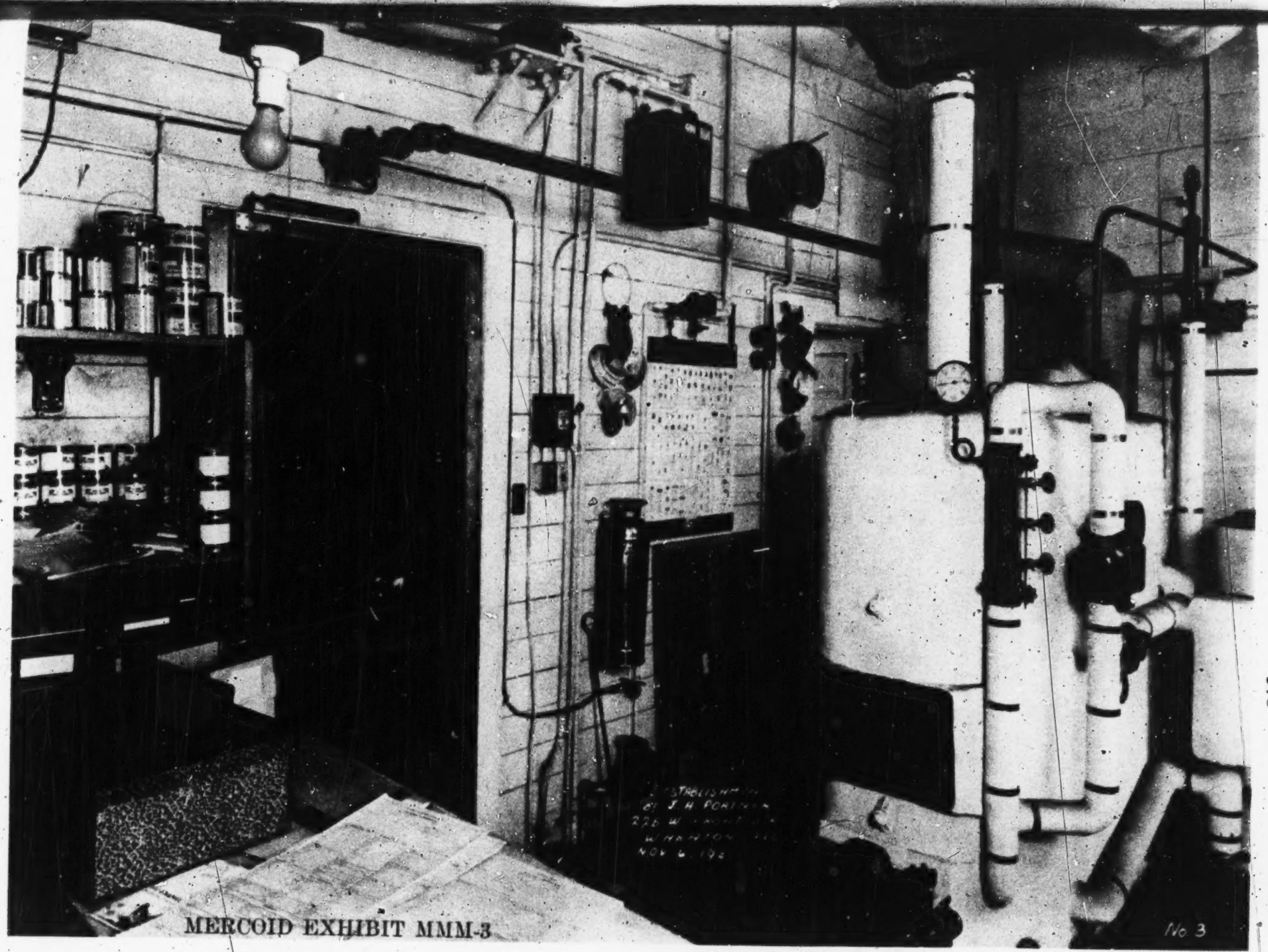
LWN:MVC



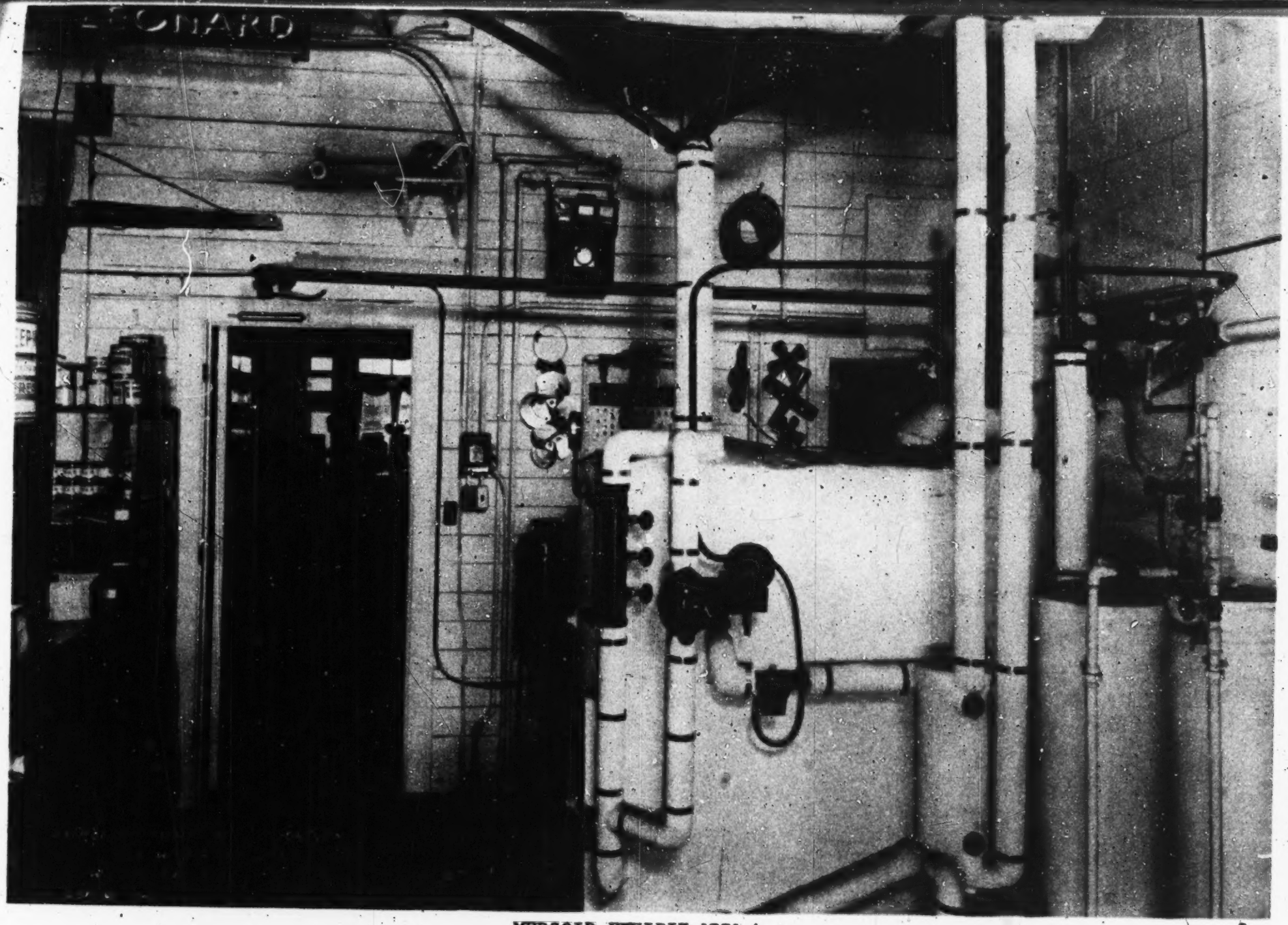
MERCOID EXHIBIT MMM-1



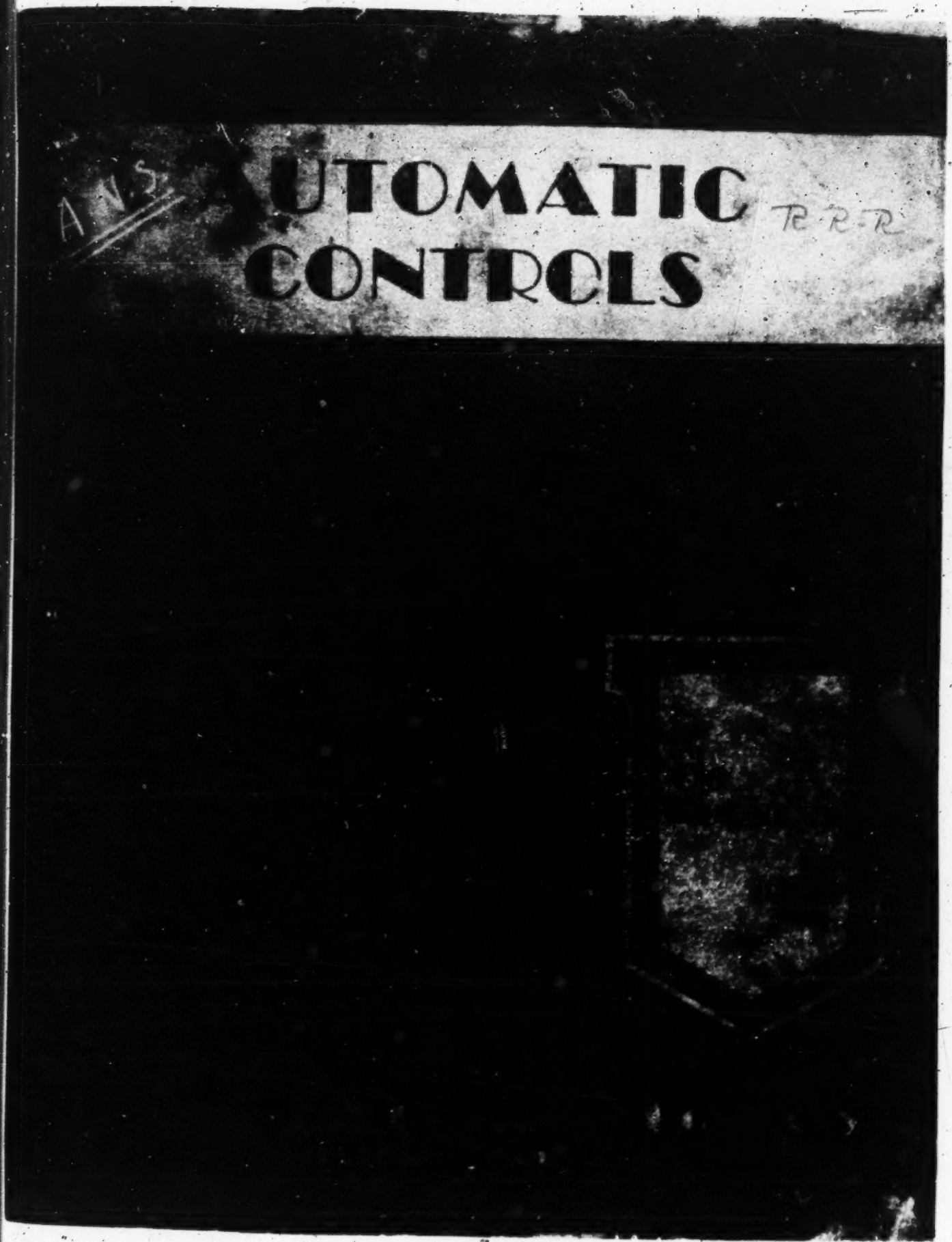
MERCOID EXHIBIT MMM-2



MERCOID EXHIBIT MMM-3



MERCOID EXHIBIT MMM-4



MERCOID EXHIBIT RRR

AUTOMATIC CONTROLS FOR OIL BURNERS



Also Manufacturers of Automatic Controls for Gas Burners, Coal Burners, Electric Refrigerators, Mechanical Stokers, Furnace Fans, Industrial Ovens, Ice Machines, Unit Heaters, Water Heaters. Also Sign Flashers, Mercury Switches, Electric Heaters, Corrugated Metal Bellows

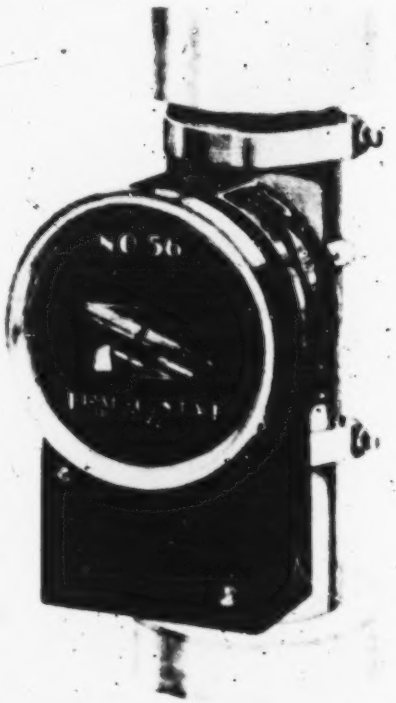
TIME-O-STAT CONTROLS COMPANY

ELKHART, INDIANA

TIME-O-STAT CONTROLS COMPANY
ELKHART, INDIANA

Surface Type Limit Control

For Hot Water Systems



The No. 56 Aquaswitch

Function

THE Aquaswitch offers accurate and dependable control of oil burner hot water systems, and, in addition, it is extremely simple to install.

This control is designed to be clamped to the hot water riser near the boiler and receives its temperature changes by conduction through its back which is in contact with the hot pipe. There is no necessity for tapping or draining the system if the Aquaswitch is used. It can be used either in a horizontal position as shown in the sketch at the bottom of the next page or in a vertical position as indicated in the illustration above.

Dual Application

Like the other Time-O-Stat Limit Controls, the No. 56 and No. 56B Aquaswitch can be used as the operating control of the burner or as a dual control in conjunction with a room thermostat. When adjusted to maintain water temperatures which will provide a satisfactory temperature in the room, the full operation of the burner may be accomplished with the Aquaswitch. Where the temperature control is desired from a room thermostat, the temperature setting on the Aquaswitch is advanced and it then acts as a safety cut-out should the room thermostat fail to cut off the burner before an excessive water temperature is reached.

Use on Domestic Hot Water Tanks

With the Aquaswitch suitably mounted on a summer hot water storage tank, it is an excellent control for maintaining water at an even temperature irrespective of thermostat operation. If the water is heated by a separate burner, the Aquaswitch may be used as a direct control for the burner. When one burner provides heat for both the house and the water in the storage tank, a Room Thermostat and Aquaswitch can be arranged to properly control the burner.

Line and Low Voltage Models

The No. 56 Aquaswitch is a two wire control and operates at line voltage. The No. 56B is a three wire control and therefore can be used successfully on three wire low voltage systems.

For those installations where the burner motor has an electrical capacity in excess of the No. 56 Aquaswitch, Time-O-Stat offers the No. 56D. This control incorporates a Con-Tac-Tor Hywatt Mercury Switch capable of handling burner motors up to one H. P. single phase. In all other respects the No. 56D is identical with other Aquaswitch models.

How it Operates

The Aquaswitch receives the various temperature changes by conduction through the back of the instrument which is in contact

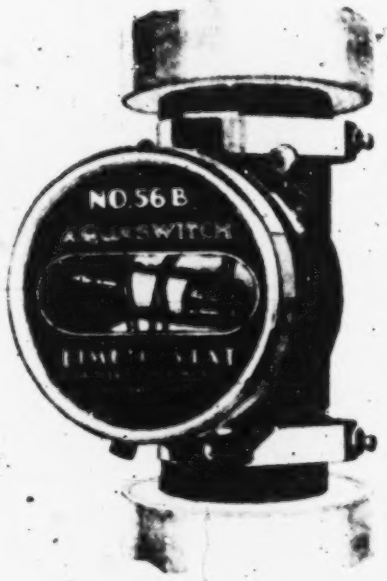
TIME-O-STAT CONTROLS COMPANY

ELKHART, INDIANA

Surface Type Limit Control

For Hot Water Systems

with the hot pipe. In the case of this control is a spiral of bimetal on the central axis on which a Mercury Switch is mounted. On a change in temperature the spiral expands or contracts, causing the rotation of the axis. Simultaneously the Mercury Switch tilts to "on" or "off", making or breaking the circuit with burner.



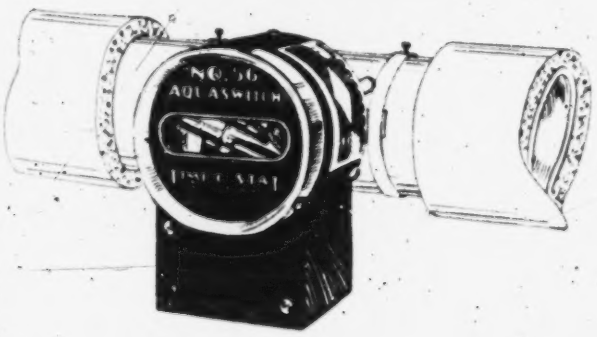
The No. 56B Aquaswitch

Construction Features

As mentioned above, the construction of the Aquaswitch is such that it insures the utmost ease of installation, through the elimination of the necessity of tapping or draining the system. In addition it can be used either in horizontal or vertical position, being equipped with two pairs of mounting ears. Whichever pair is not utilized may be removed.

This control can be adjusted for a temperature range of from 100° to 200° F. and the differential between the cut-in and cut-out temperature is 10° F. There is an external adjustment lever and graduated scale for the setting of the temperature range. This control, equipped with a Mercury Switch whose contacts cannot be affected by dust, moisture or corrosion, will give long and satisfactory service.

Horizontal Installation



SPECIFICATIONS

No. 56 (2 wire) : For line voltage circuits.
Resistance Loads: 10 A. 110 V.; 5 A. 220 V.
Motor Loads: ½ H. P. 100-250 V. A.C.; ¼ H. P. 100-250 V. D.C.
On D.C. or 25 Cycle parallel Mercury Switch with M377 Condenser. See page on Condenser at back of catalog.

No. 56B (3 wire): 4 A. 25 V. For low voltage circuits.

No. 56D (2 wire) : For line voltage circuits.
Resistance Loads: 15 A. 110 V.; 10 A. 220 V.
Motor Loads: 1 H. P. 100-250 V. A.C.; ½ H. P. 100-250 V. D.C.
Adjustable Range: 100° to 200° F.
Differential (Not Adjustable): 10° F.
Shipping Weight: 4 lbs.
Height: 5½". Width: 4½". Depth: 2½".

List Price, No. 56 or 56B *$17.50*

List Price, No. 56D *$20.00*

INSTALLATION INSTRUCTIONS

IMPORTANT: Do not attempt any adjustments until these instructions are thoroughly understood.

TYPES M-80, M-82, M-84 WARM AIR COMBINATION FAN and LIMIT CONTROLS

Patent Numbers 1,398,874, 1,640,869 1,705,909, 1,757,436, 1,834,288, 1,884,046, 2,018,310. Others Pending

EXHIBIT No. 1-2-3 ... 1940 ... COMMISSIONER
DATE ... NOTARY PUBLIC, COOK CO., ILLINOIS

CAUTIONS

1. Mercoid Combination Furnace Controls leave the factory with the bi-metallic element properly formed, heat treated, stabilized and calibrated.

DO NOT TWIST BI-METAL COIL as twisting or bending may permanently distort it. Not only will this destroy the correct calibration of the instrument but also the accurate performance after adjustment is made. In case of a badly distorted bi-metallic element, send control to factory for recalibration, or a new bi-metallic element may be ordered for replacement. In ordering element, give serial number of instrument.

Should the temperature reading be in error due to a twisted bi-metallic element, if not excessively twisted it may be readjusted by allowing the instrument to reach room temperature, loosening the nut in the center of the dial and moving dial until correct reading is obtained, then tighten nut.

2. DO NOT OVERLOAD—Check name-plate which shows the electrical capacity in amperes, and make certain that the load is within this rating.

3. DO NOT OIL PARTS—All bearings are self lubricating. Oil accumulates dirt, becomes gummy with age and heat, and interferes with the operation of the control.

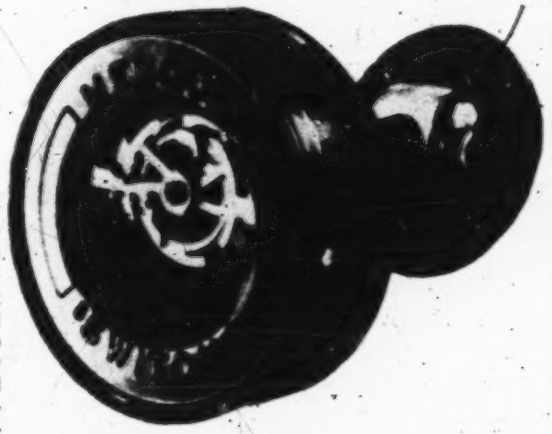
4. DO NOT OVERHEAT—Instrument must not be subjected to temperatures higher than maximum shown on nameplate or graduated scale.

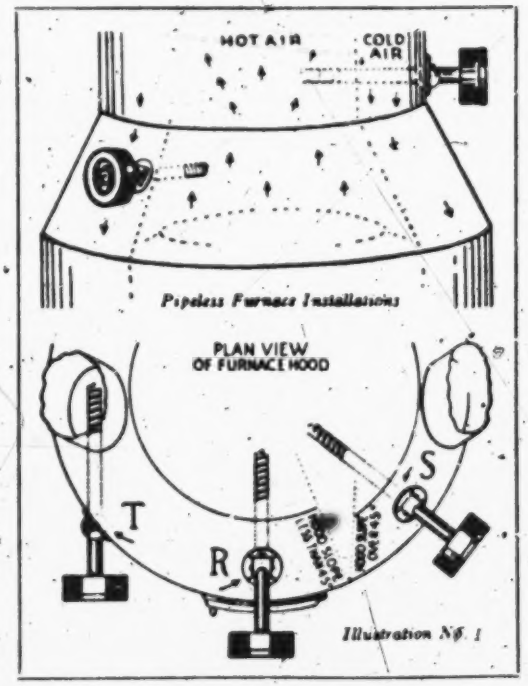
TYPE M-80SW, M-82SW, M-84SW — WITH LOCK TYPE SUMMER SWITCH

These instruments are provided with a manual switch for operating the fan for ventilating purposes during "Summer" or periods when the furnace is not heated. By turning button on front of case to left or anti-clockwise the fan switch will lock in "On" position. This lock will automatically release and return instrument to normal "Winter" operation as soon as the furnace is again heated.

MOUNTING

Select proper location for both appearance and operation. Do not locate bi-metallic element less than three inches from the dome.





Pipeless Furnace Installations

Illustration No. 1



Illustration No. 2
"K" Flange Bolt, "L" Instrument Stem, "N" Retaining Clamp, "O" Locking Nut, "P" Flange Bracket.

Control is usually placed on sloped hood. The adjustable flange permits mounting on any hood angle from 30 to 90 degrees, and the instrument will always be at a radius from the center of the dome. (See illustration 1 designated by "R" and "S".) If the furnace is so constructed that the control cannot be mounted on the sloped hood, or if there are internal obstructions such as fan blades, the control can be mounted on the straight side walls and positioned as shown in "T" illustration 1. The flange in this case is mounted so that it is adjustable horizontally, and the control can be positioned so that it faces directly to the front.

After location has been determined, cut a 2⅛" or 2½" hole with a rotary hack saw. Place adjustable flange against hole in correct position, and mark holes for screws. Punch a small hole at each screw position, and then fasten flange with the four sheet metal screws furnished.

If the control does not slide easily into the flange, loosen the locking nut "O" illustration 2 and position the flange bolt "K" so that its curved side is down. Do not force the control or the bi-metal coil may be distorted.

Before tightening the locking nut "O", illustration No. 2, see that the instrument is level and also vertically lined up. This may be determined by sighting across cover screws "C-C" (see illustration No. 3) and making certain that they are level or horizontal. It is also well to check back to see that both mercury tube switches "A" and "B" illustration No. 3, are in free operating order. This is done by first carefully opening up or separating the "high" and "low" adjustments on each side of the dial to their widest differential or as far as they will go as shown by arrows "D" in illustration No. 3. After this is done both the fan switch tube and limit switch tube should be free to tilt to either side.

Note carefully that when tilting each switch, first to one side and then to the other, that the tubes remain respectively to the sides that they are tilted. This will be an assurance that the control is in correct operating position.

(Continued on other side)

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INSTALLATION INSTRUCTIONS (cont'd)

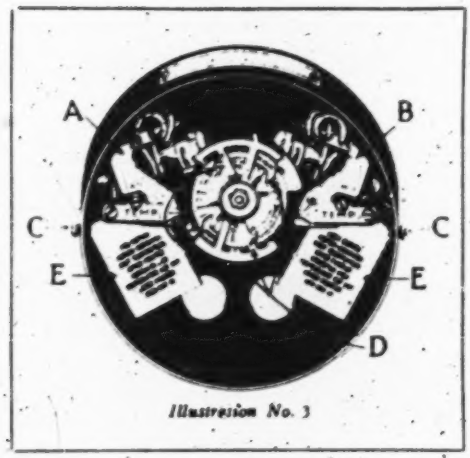


Illustration No. 3


Illustration No. 5

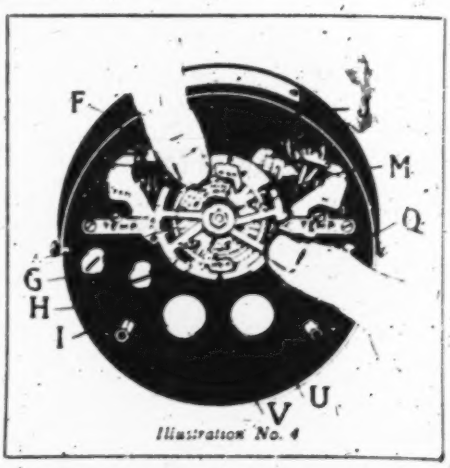


Illustration No. 4

WIRING

Take off both shield insulating plates "E" illustration No. 3, by removing the screws at the bottom of each plate. Terminals "G" and "H" at the left, are for Fan Switch connections and terminals "U" and "O" at the right are for Limit Switch connections.

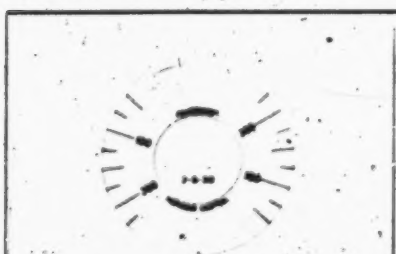
When making connections, scrape and clean the wires and carefully place around the terminal screws and in the groove provided (see illustration No. 5). After wiring, fasten insulating plates back in position, seeing that the printed instructions are kept to the outside so that they may be read. Rigid conduit must not be attached directly to instrument case. Use short strips of BX to relieve control of conduit expansion and contraction strains.

ADJUSTMENT

The instrument can now be adjusted to the desired operating points.

The fan control is usually set about 120 degrees low to 150 degrees high. On the majority of warm air installations, using forced circulation, the limit switch is usually set to cut out at temperatures between 200 and 250 degrees. The cut-in point is usually set at approximately 50 degrees below the cut-out point. There are, however, many installations in which this particular adjustment might be insufficient or excessive, therefore a careful study of each case must be made.

When setting the cut-in and cut-out points, hold the ratchet wheel dial, snugly with your thumb or finger to keep it from moving while you press and shift the indicating "high" and "low" lever settings. Illustration No. 4 shows the thumb holding the wheel "F" while the other thumb is used in pressing back and moving the "low" limit lever setting "M." The reason for pressing the "high" and "low" settings (four in all) before attempting to shift to the desired setting is shown in illustration No. 6. Note in illustration No. 6, the picture to the right, as both high and low settings are being pressed, it disengages the prongs "W" and "X", out and away from the ratchet wheel, to permit moving the adjustment up or down. As soon as the pressure is released, the prongs spring back between the teeth of the ratchet, thereby securely fixing the setting. Care should be taken after each setting is made, to see that the prongs are engaged between the ratchet teeth as shown in the left illustration indicated as "Y" on the high and "Z" on the low setting.


The illustration above shows dial with range used on Type M-82.

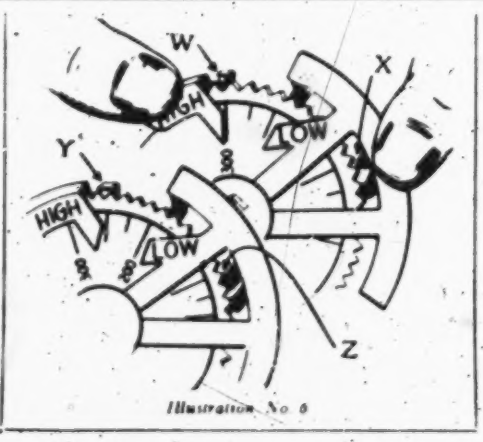
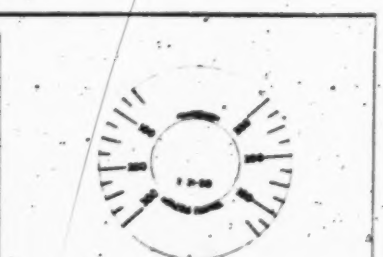


Illustration No. 6


The illustration above shows dial with range used on Type M-80.

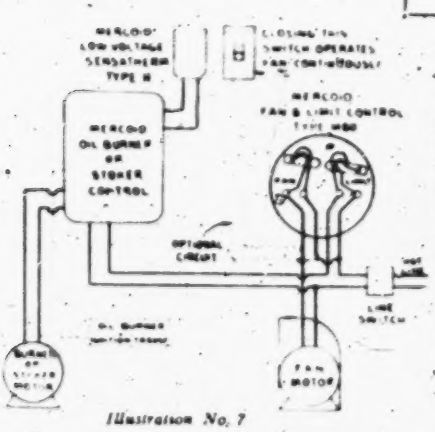


Illustration No. 7

Fan hook-up in connection with oil or stoker fired warm air furnace. Closing optional circuit operates fan continuously for ventilating purposes during summer.

With this hook-up, after the thermostat is satisfied, the fan will continue to run until the temperature in the furnace bonnet drops to the control setting.

Stokatherm or Stok-A-Timer control of single phase stoker and circulating fan motors on warm air system. When Sensatherm calls for heat stoker starts but fan can start only after furnace is heated. When room is at required temperature, Sensatherm circuit opens which immediately stops both fan and stoker motor.

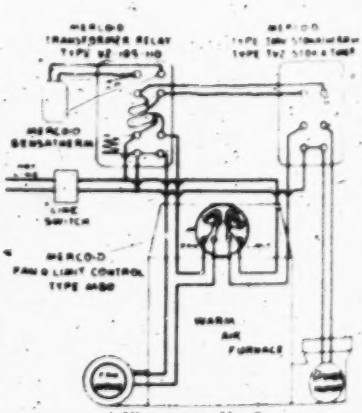


Illustration No. 8

INSTALLATION INSTRUCTIONS

MERCOID WARM AIR FURNACE CONTROLS

TYPES M-51, M-52, M-53, M-53 SW, M-55, M-56, M-57, M-57 SW

Patent Numbers 1,598,874, 1,640,869, 1,705,989, 1,753,957, 1,757,436, 1,834,288, 1,884,046. Others Pending

CAUTIONS

1. Mercoid Furnace Controls leave the factory with the bi-metallic element properly formed, heat treated, stabilized and calibrated.

DO NOT TWIST THE BI-METAL COIL as any manual twisting or bending may permanently distort it. Not only will this destroy the correct calibration of the instrument but also the accurate performance after adjustment is made. It is recommended in case of a badly distorted bi-metallic element, that the instrument be either sent back to the factory for recalibration or a new bi-metallic element ordered for replacement. In ordering element for replacement the serial number of the instrument should be supplied.

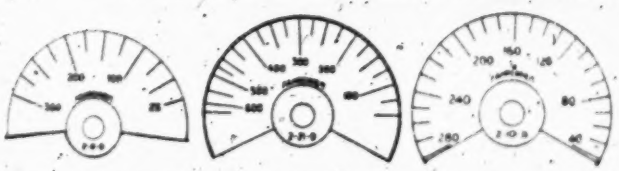
Should the temperature reading be in error due to an accidentally twisted bi-metallic element, if not excessively twisted it may be readjusted by allowing the instrument to reach room temperature, loosening the nut in the center of the dial and moving dial until correct reading is obtained, after which the nut should be tightened.

2. DO NOT OVERLOAD—Check the instrument nameplate which shows the electrical capacity in amperes, and make certain that the load to be handled is within this rating.

3. DO NOT OIL ANY PARTS—All bearings are self lubricating. Oil accumulates dirt, becomes gummy with age and heat, and interferes with the free operation of the control mechanism.

4. DO NOT OVERHEAT—At no time should the instrument be subjected to a temperature higher than the maximum shown on the nameplate or graduated scale.

STANDARD DIALS USED ON MERCOID FURNACE CONTROLS



Standard dials for types M-51, M-52, M-53 and M-53SW

Standard for type M-55, M-56, M-57 and M-57SW

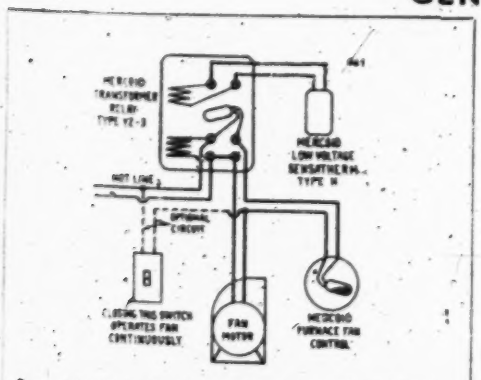
Type M-51, M-52, M-53 and M-53SW are available with two different bimetal coils for different temperature ranges. The operation of these instruments is in accordance with the graduations on the dials as shown.

Type M-55, M-56, M-57 and M-57SW dial is graduated evenly and gives extremely close regulation at any point on its range. This type instrument should be employed in place of Type M-51, M-52, M-53 or M-53SW when very close operating differentials are desired, and the operating temperature is within the range of this instrument.

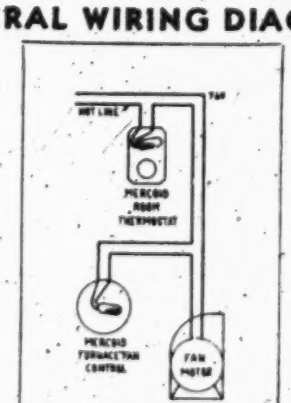
TYPE M-53 SW and M-57 SW — WITH LOCK TYPE SUMMER SWITCH

Types M-53SW and M-57SW normally prevent operation of the fan unless the furnace is heated. To operate the fan for ventilating purposes during "Summer" or periods when the furnace is not heated, turn button on back of the case to the right or clockwise. The switch will lock in the "On" position and permit operation of the blower as desired, but will automatically release and return to normal "Winter" operation as soon as the furnace is again heated.

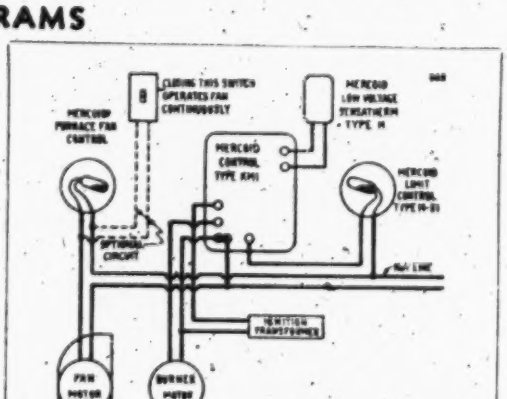
GENERAL WIRING DIAGRAMS



General hook-up showing optional fan switch circuit. By closing this circuit fan can be operated for ventilating purposes during summer. No changes of control setting are required.



Simplified hook-up where high voltage thermostat is employed.



Fan hook-up in connection with oil fired warm air furnace. Closing optional circuit operates fan continuously for ventilating purposes during summer.

(Continued on other side)

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INSTALLATION INSTRUCTIONS (cont'd)

MOUNTING

Care should be used in selecting a proper location for both appearance and operation. Do not locate bimetallic element less than three inches from the dome.

The instrument is usually placed on the sloped hood of the furnace. The adjustable flange permits mounting on any hood angle from 30 to 90 degrees, and the instrument will always be at a radius from the center of the dome. (See illustrations 3 and 4 designated by "R" and "S.") If the furnace is so constructed that the control cannot be mounted on the sloped hood, or if there are internal obstructions such as fan blades, the control can be mounted on the straight side walls and positioned as shown in "T" illustration 4. The flange in this case is mounted so that it is adjustable horizontally, and the control can be positioned so that it faces directly to the front.

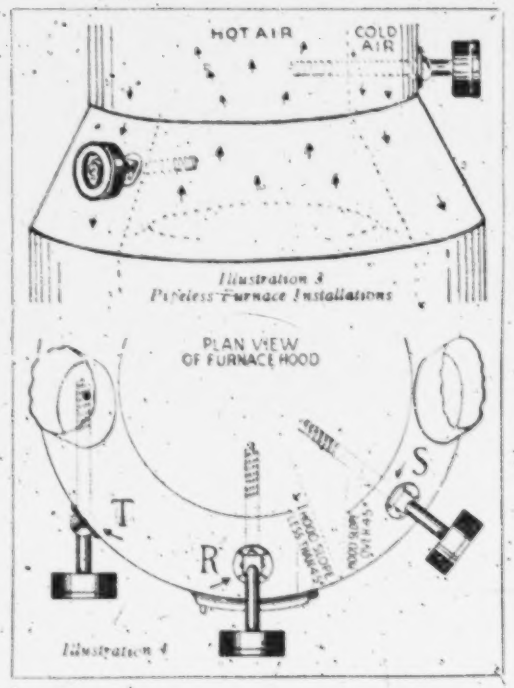


Illustration 3 Pipeless Furnace Installations

Illustration 4

After the proper location has been determined, cut a 2⅜" or 2½" hole by means of a rotary hack saw. Place the adjustable flange against the hole and in the correct position, and mark the holes for the screws. Punch a small hole at each screw position, and then fasten the flange by means of the four sheet metal screws furnished.

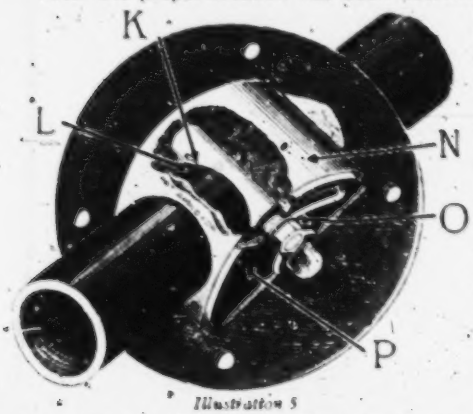


Illustration 5

"K" Flange Bolt, "L" Instrument Stem, "N" Reading Cam, "O" Locking Nut, "P" Flange Brackets.

If the control does not slide easily into the flange, loosen the locking nut "O" illustration 5 and position the flange bolt "K" so that its curved side is down. Do not force the control or the bimetal coil may be distorted.

Before tightening the locking nut "O", see that the instrument is level and also lined up vertically. This may be determined by separating the "high" and "low" adjustable pointers, "C" and "D"; illustration 6, far enough apart so that they hold the switch kicking plates away from the switch tripping arm "E." The switch must move freely from left to right without interference of the kicking plates. If the switch remains to either the right or left after tilting with the finger, the instrument is ready to be fastened by tightening lock nut on flange.

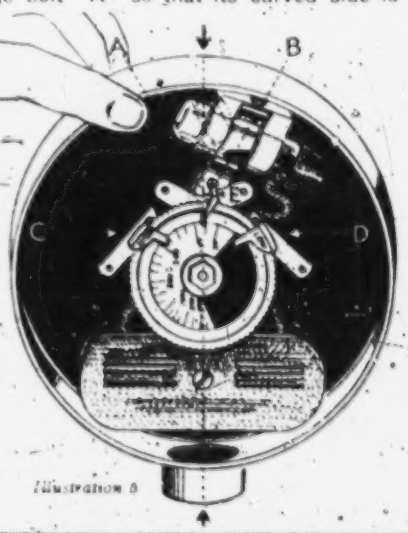


Illustration 6

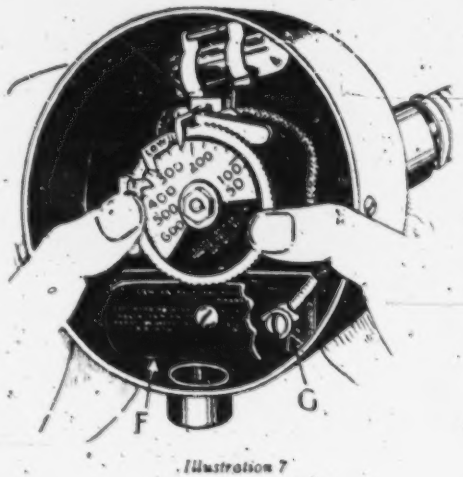


Illustration 7

WIRING


Illustration 8

Remove insulating plate indicated as "F" in illustration 7, by removing screw located in center of plate. Scrape and clean the wires and carefully place around the terminal screws and in the groove provided (see illustration 8). After wiring, fasten insulating plate back in position.

ADJUSTMENT

The instrument can now be adjusted to the desired operating point.

For fan control the usual setting is about 120 degrees low to 150 degrees high. In case the M-51 is used as a limiting device, the majority of warm air installations are set at approximately 250 to 300 degrees. There are, however, many installations in which this particular adjustment might be insufficient or excessive, therefore a careful study of each case must be made. BEAR IN MIND THAT THE SAME RESULTS OF OPERATION CAN BE OBTAINED BY LOCATING THE BIMETALLIC ELEMENT FARTHER AWAY FROM THE DOME AND ADJUSTING TO OPERATE AT A LOWER RANGE. When setting the cut-in and cut-out points, hold the ratchet wheel firmly with one hand while pressing and moving either the high or low pointer, see illustration 7. When pressing pointers see that the catch between the teeth of the ratchet wheel is disengaged, as shown in "I" illustration 9. When releasing the pressure, be certain that the catch is again engaged, as shown in "J."

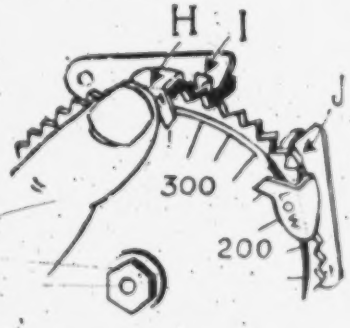
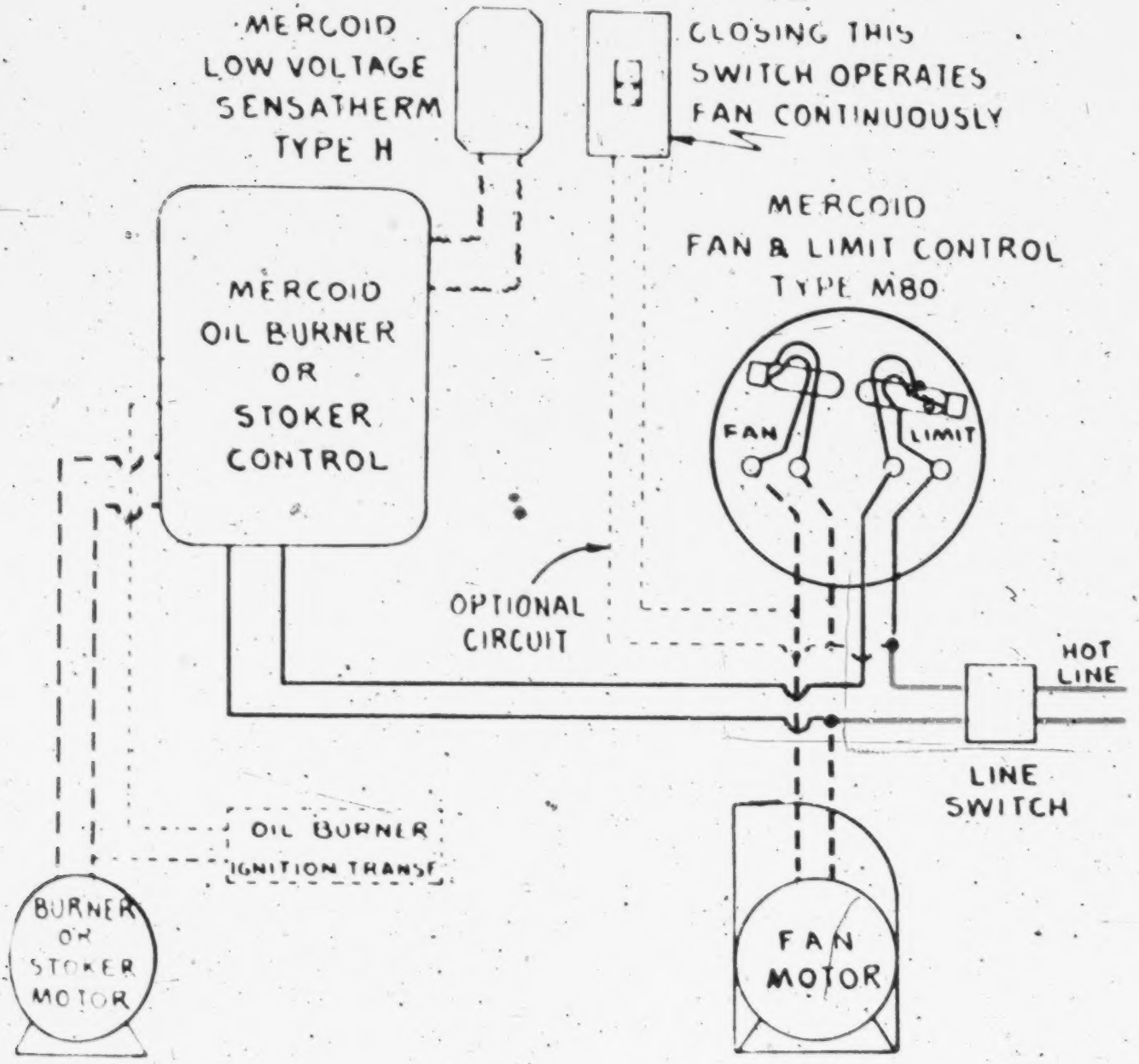


Illustration 9



POSITION 1: ROOM WARM - FURNACE COLD

Room thermostat off

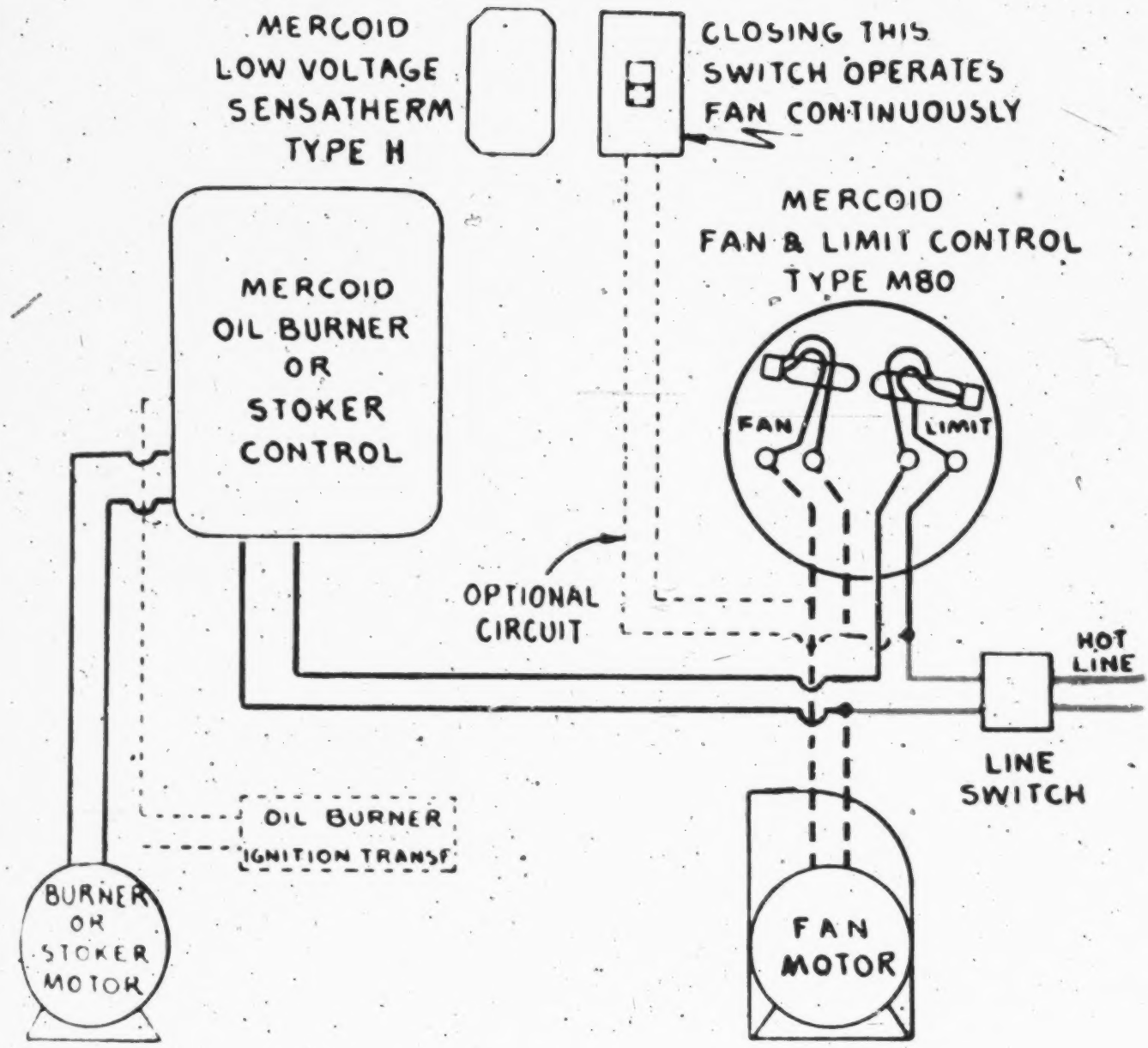
Limit switch closed

Fan switch open

Burner off

Fan off

M-H EXHIBIT 2a



POSITION 2: ROOM COLD - FURNACE COLD

Room thermostat on

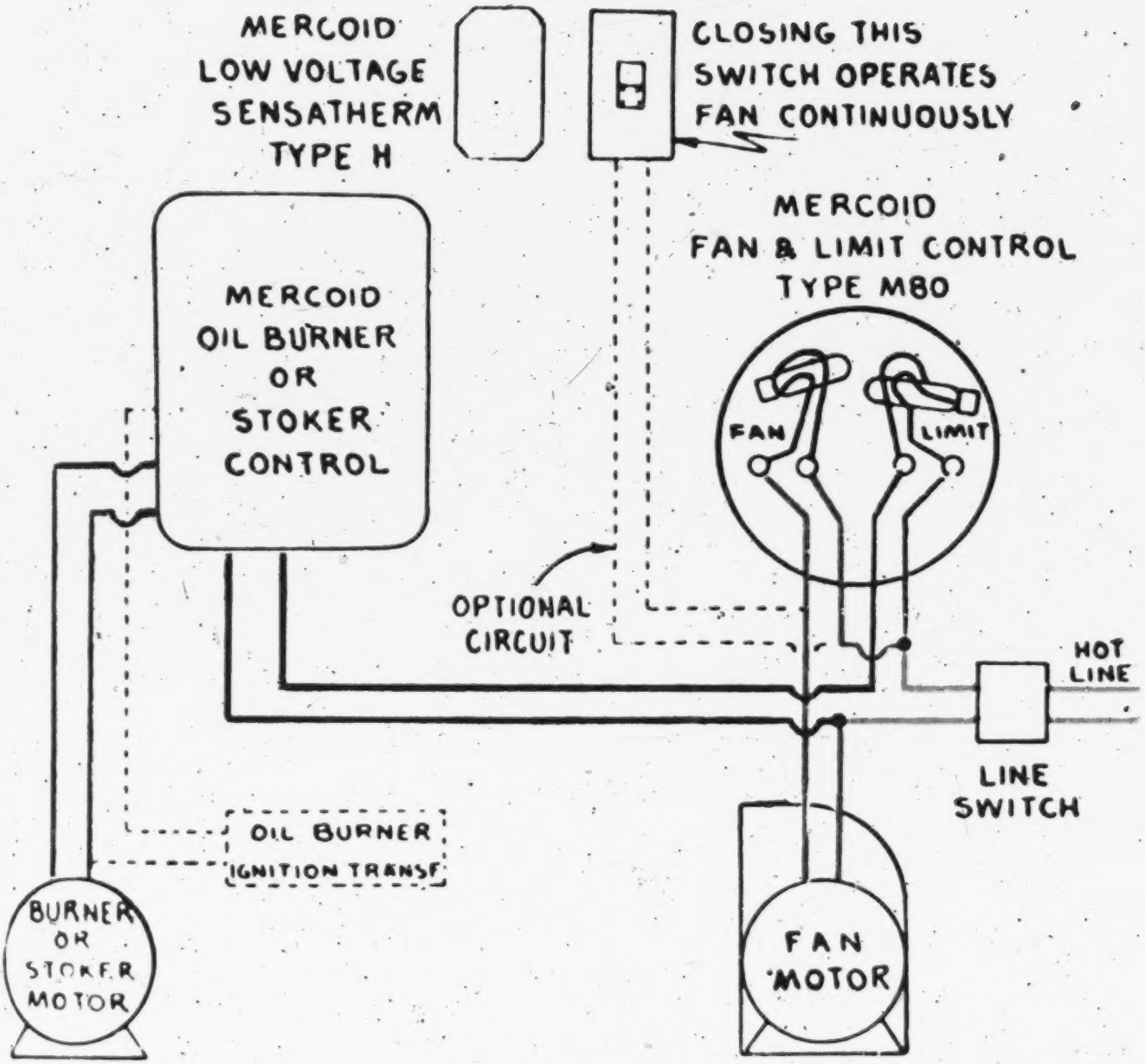
Limit switch closed

Fan switch open

Burner on

Fan off

M-H EXHIBIT 2b



POSITION 3: ROOM COLD - FURNACE WARM

Room thermostat on

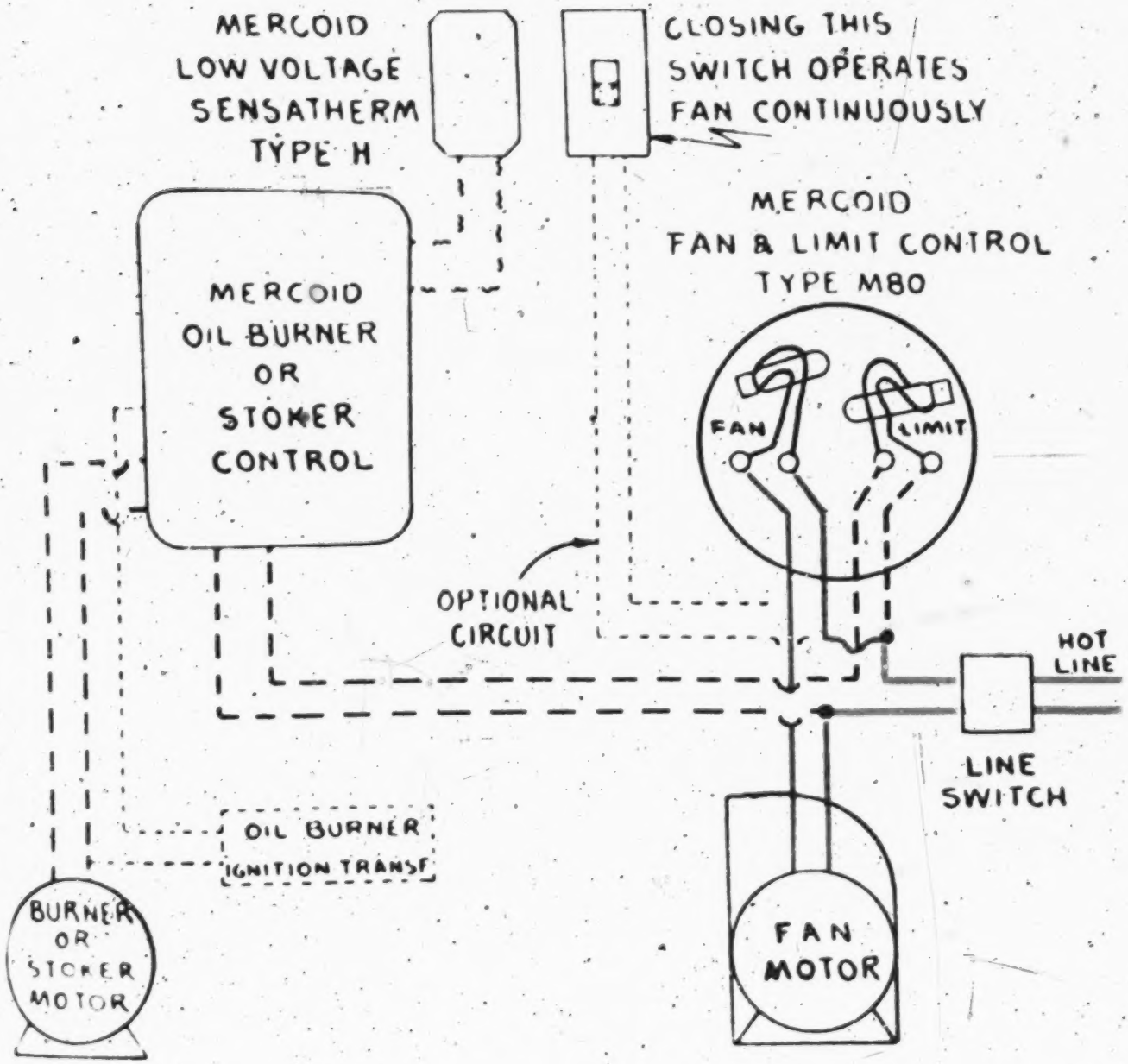
Limit switch closed

Fan switch closed

Burner on

Fan on

M-H EXHIBIT 2c



POSITION 4: ROOM COLD - FURNACE HOT

Room thermostat on

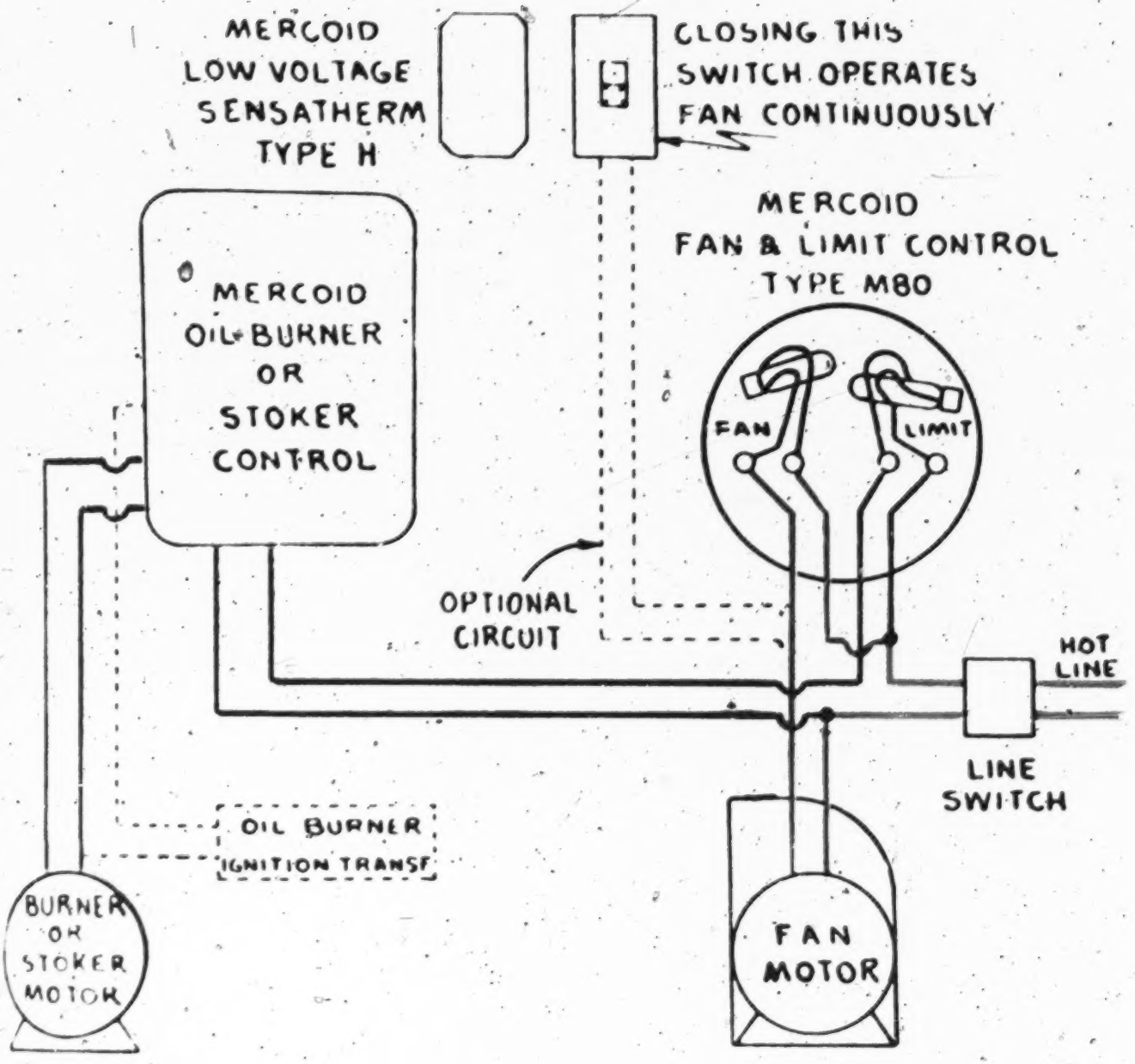
Limit switch open

Fan switch closed

Burner off

Fan on

M-H EXHIBIT 2d



POSITION 5: ROOM COLD - FURNACE WARM

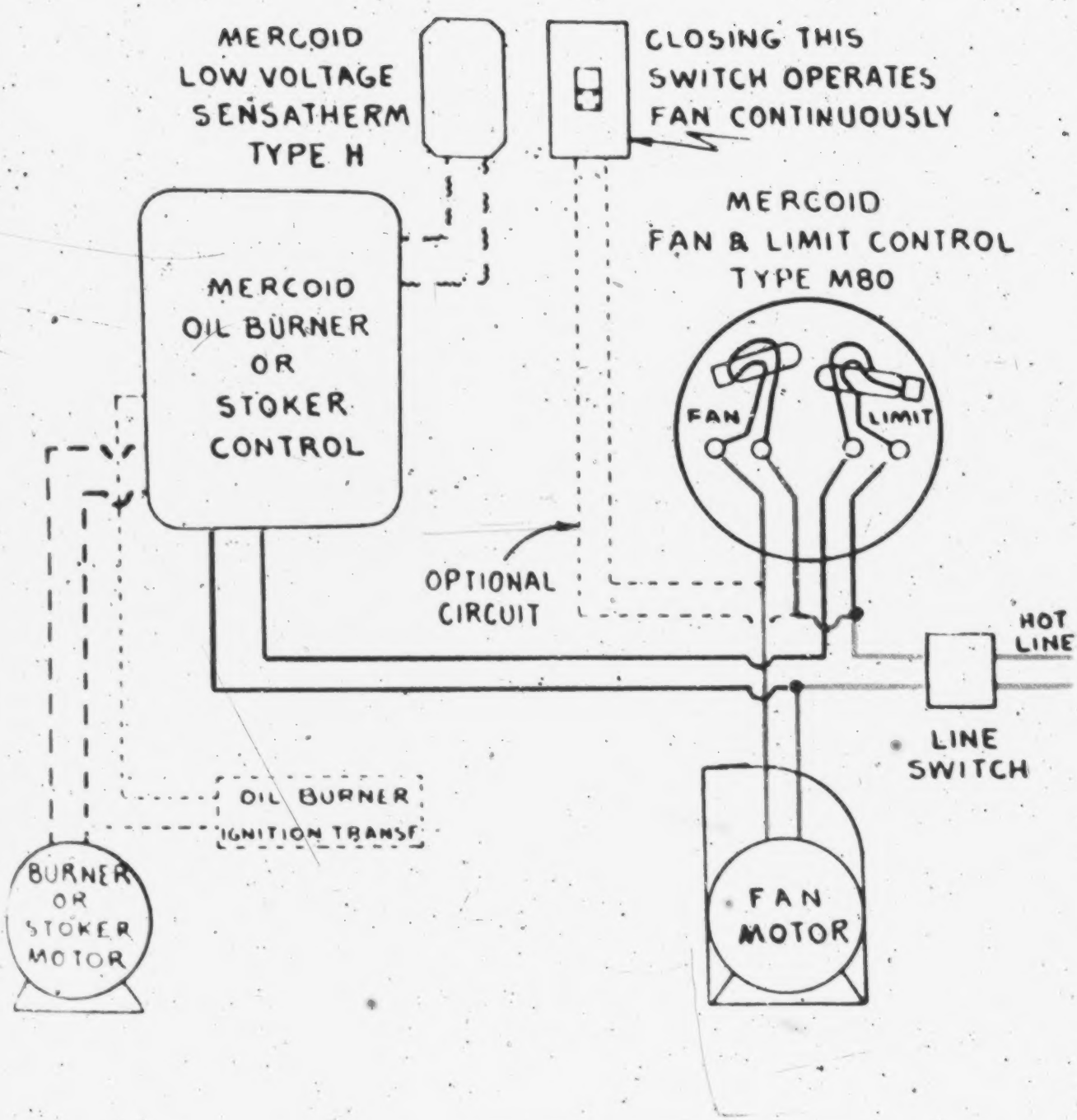
Room thermostat on

Limit switch closed

Fan switch closed

Burner on

Fan on



POSITION 6: ROOM WARM - FURNACE WARM

Room thermostat off

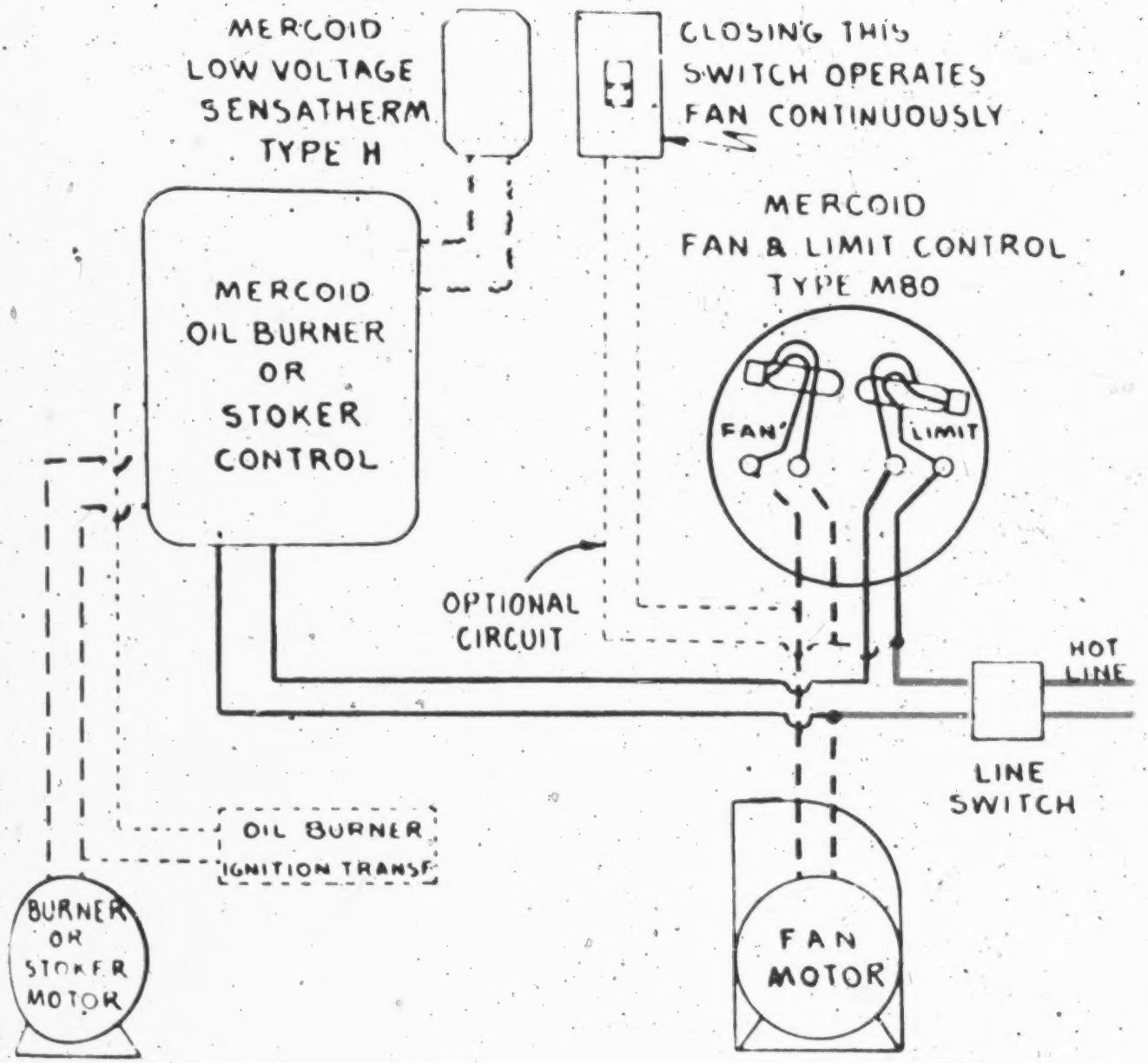
Limit switch closed

Fan switch closed

Burner off

Fan on

M-H EXHIBIT 2f



POSITION 7: ROOM WARM - FURNACE COLD

Room thermostat off

Limit switch closed

Fan switch open

Burner off

Fan off

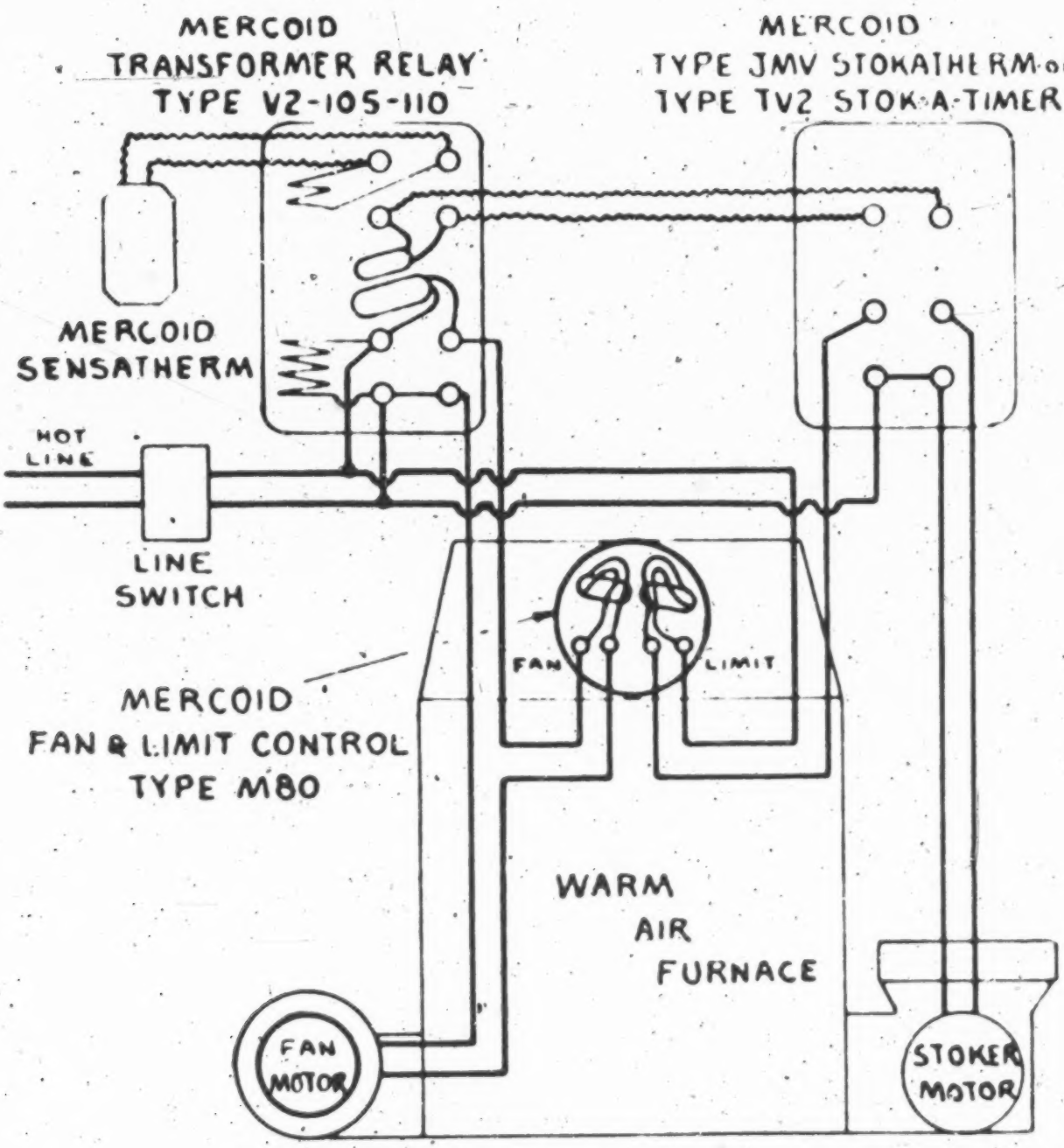
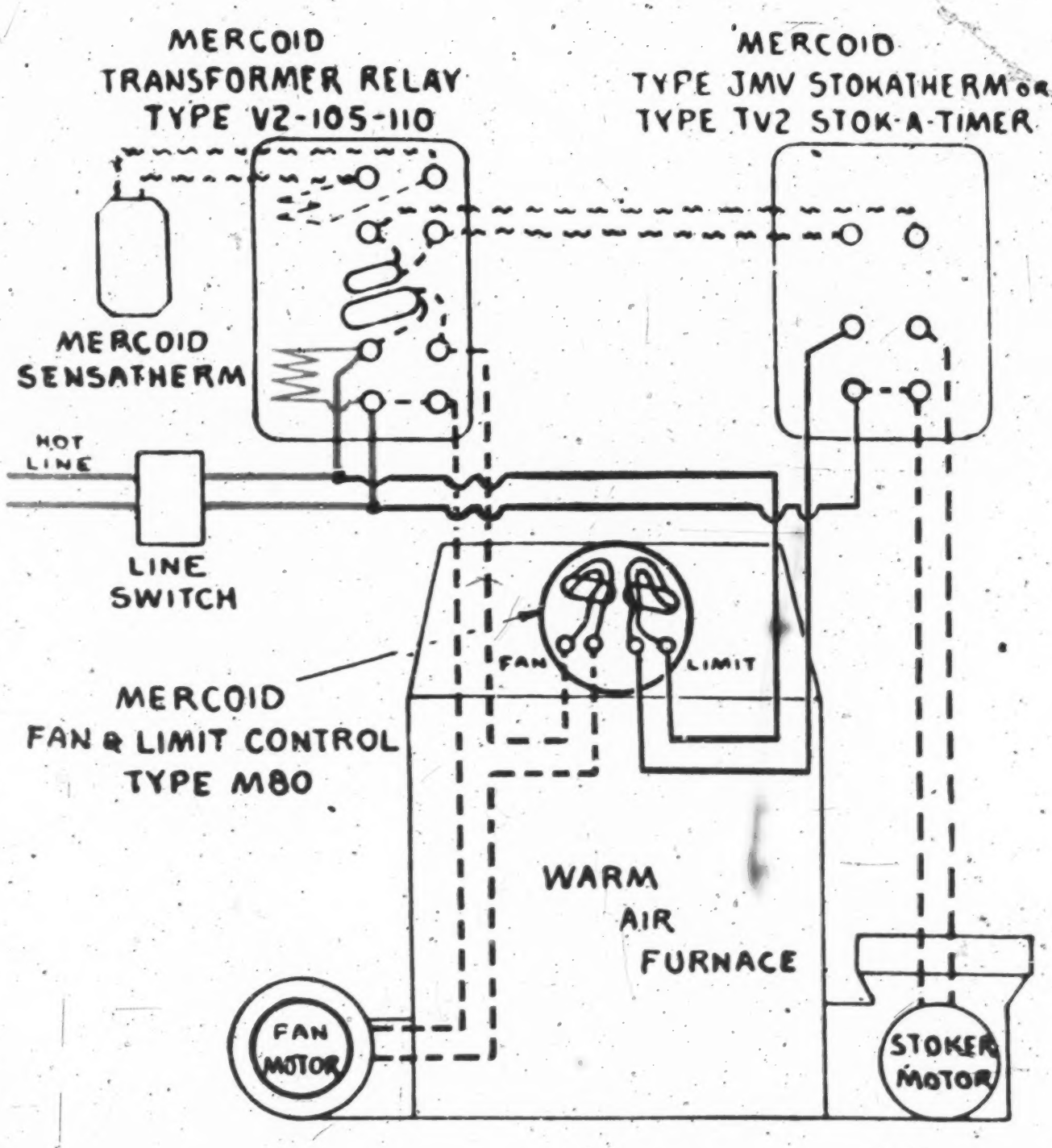


Illustration No. 8



POSITION 1: ROOM WARM - FURNACE COLD

Room thermostat off

Relay deenergized

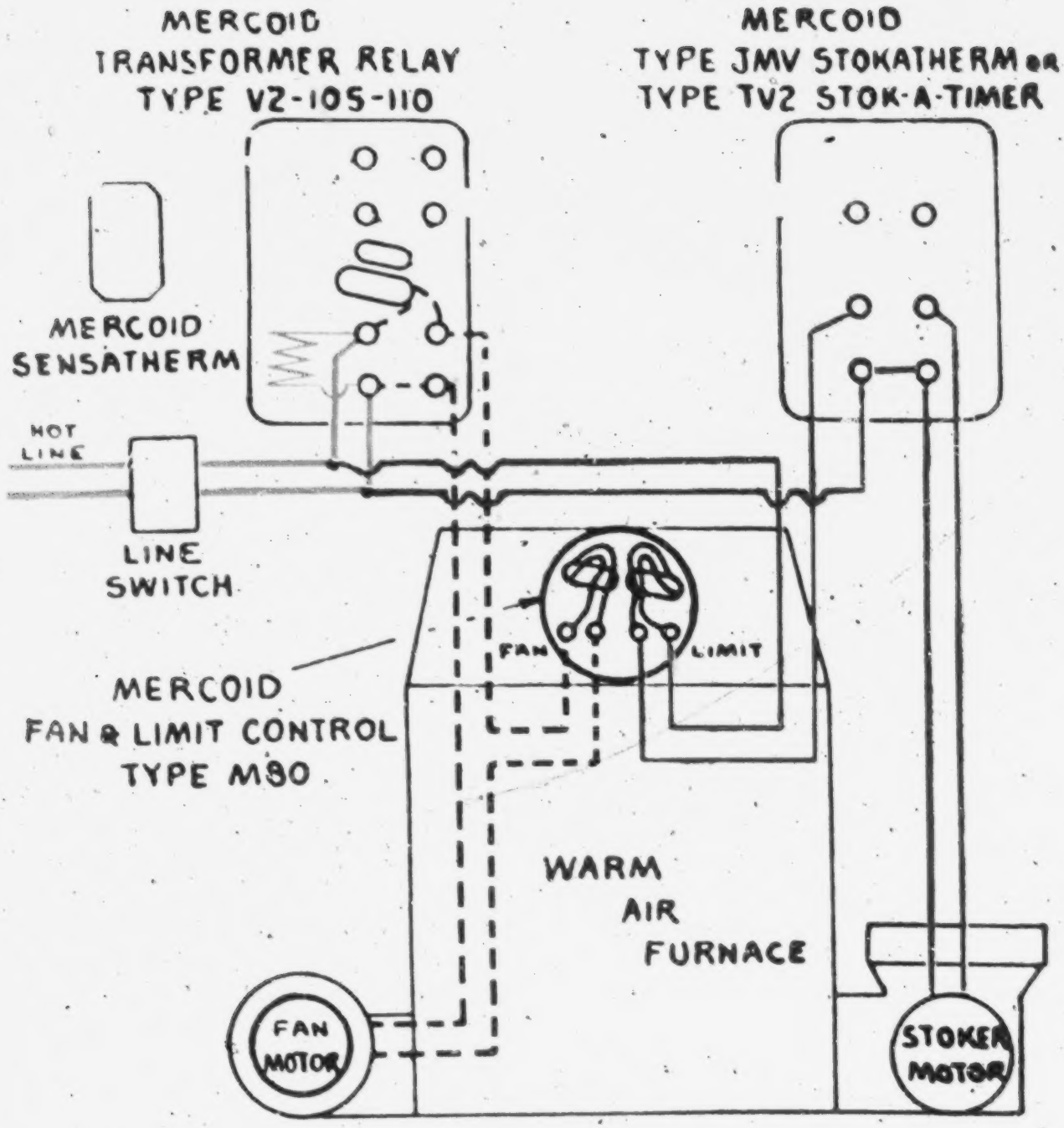
Limit switch closed

Fan switch open

Stoker off

Fan off

EXHIBIT 3a



POSITION 2: ROOM COLD - FURNACE COLD

Room thermostat on

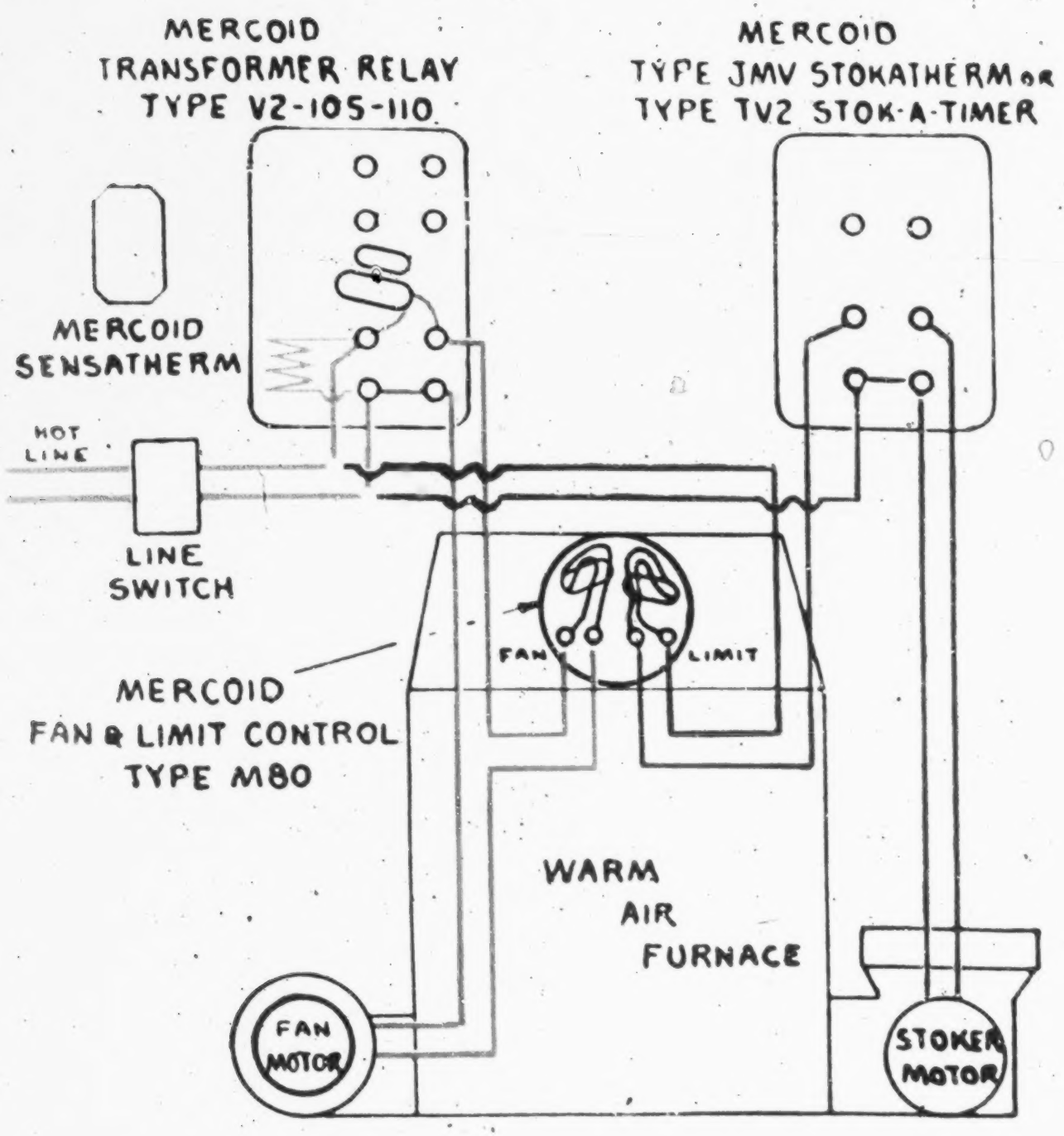
Relay energized

Limit switch closed

Fan switch open

Stoker on

Fan off



POSITION 3: ROOM COLD - FURNACE WARM

Room thermostat on

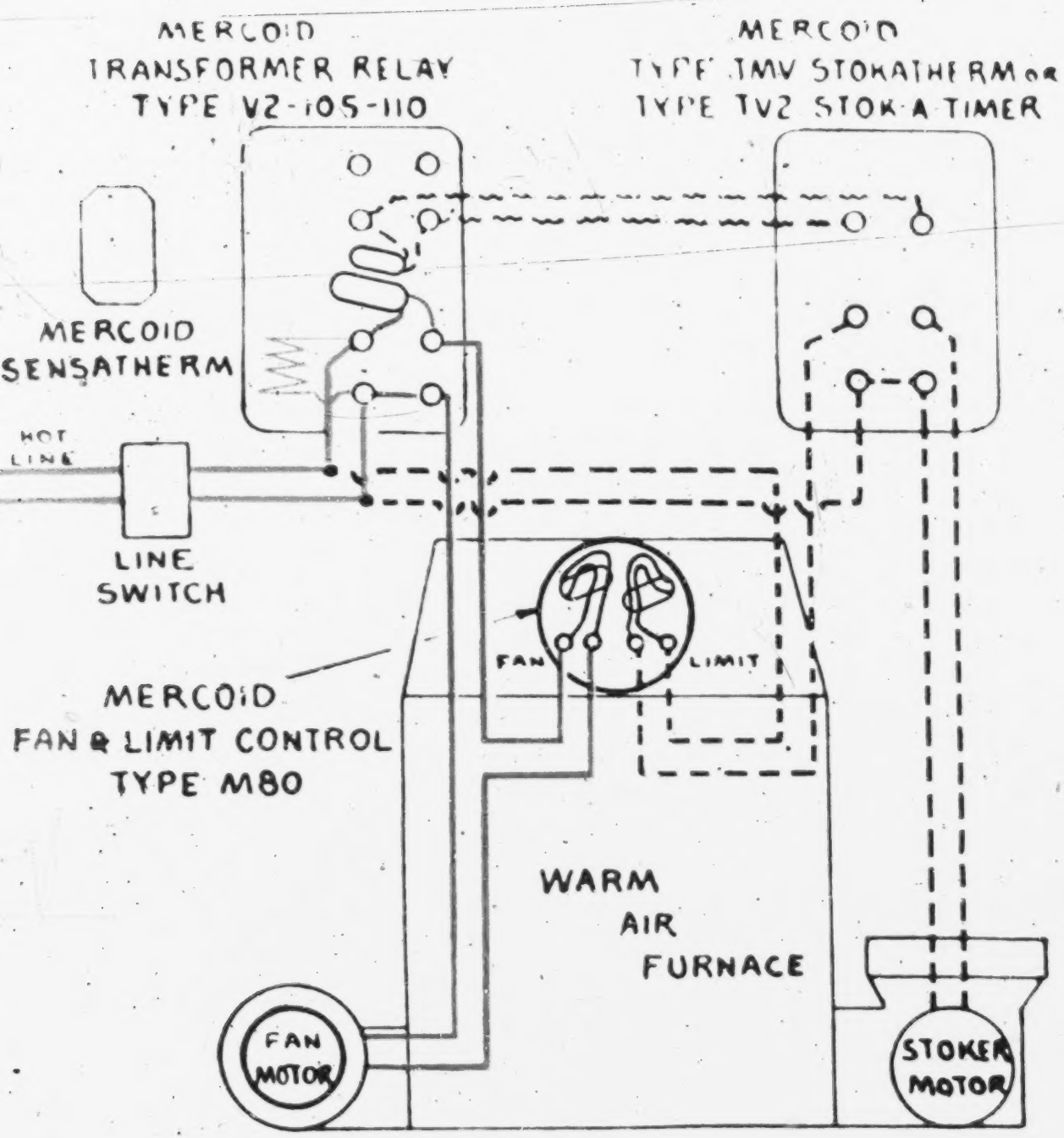
Relay energized

Limit switch closed

Fan switch closed

Stoker on

Fan on



POSITION 4: ROOM COLD - FURNACE HOT

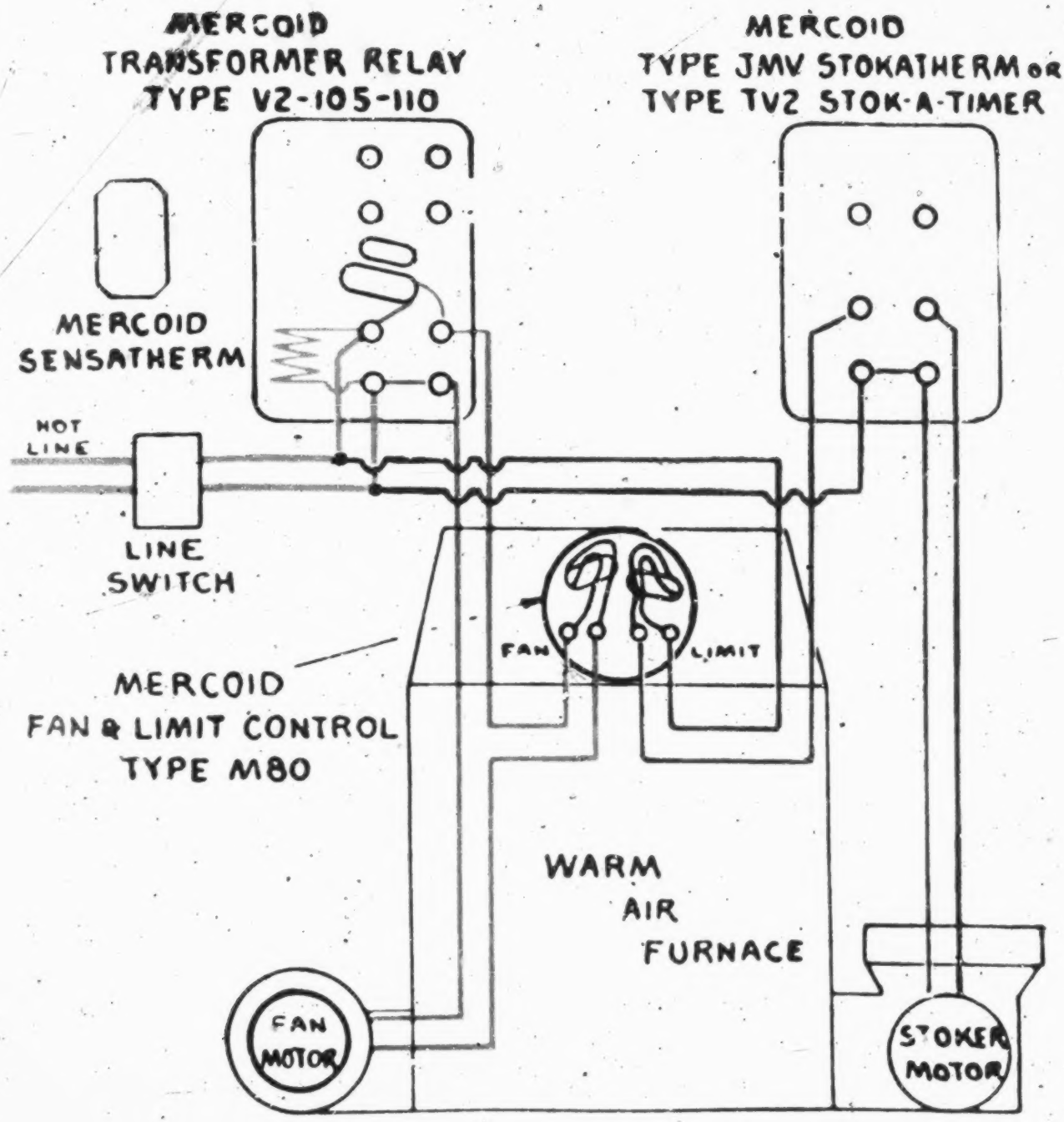
Room thermostat on

Relay energized

Limit switch open

Fan switch closed

Stoker off



POSITION 5: ROOM COLD - FURNACE WARM

Room thermostat on

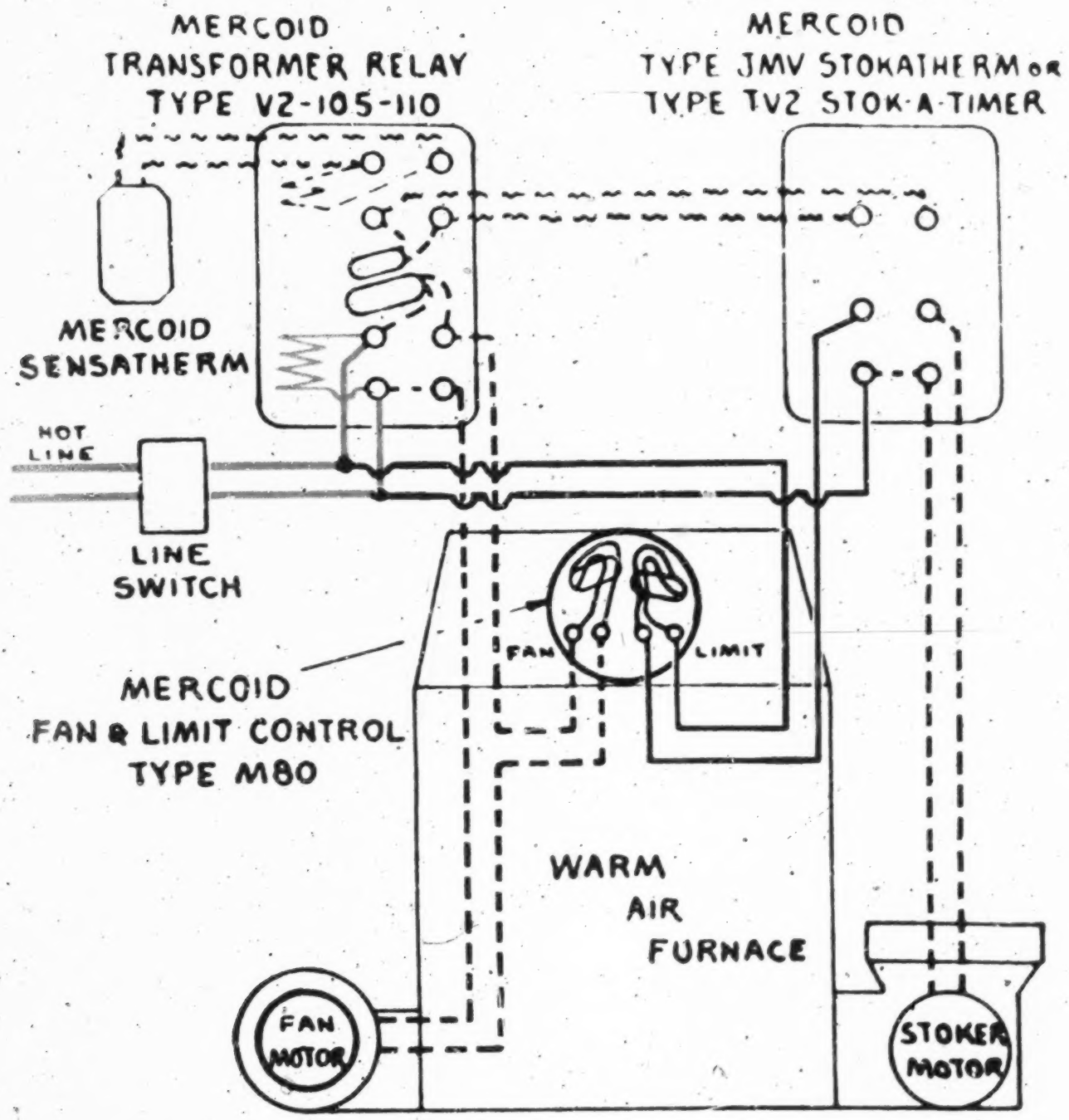
Relay energized

Limit switch closed

Fan switch closed

Stoker on

Fan on



POSITION 6: ROOM WARM - FURNACE WARM

Room thermostat off

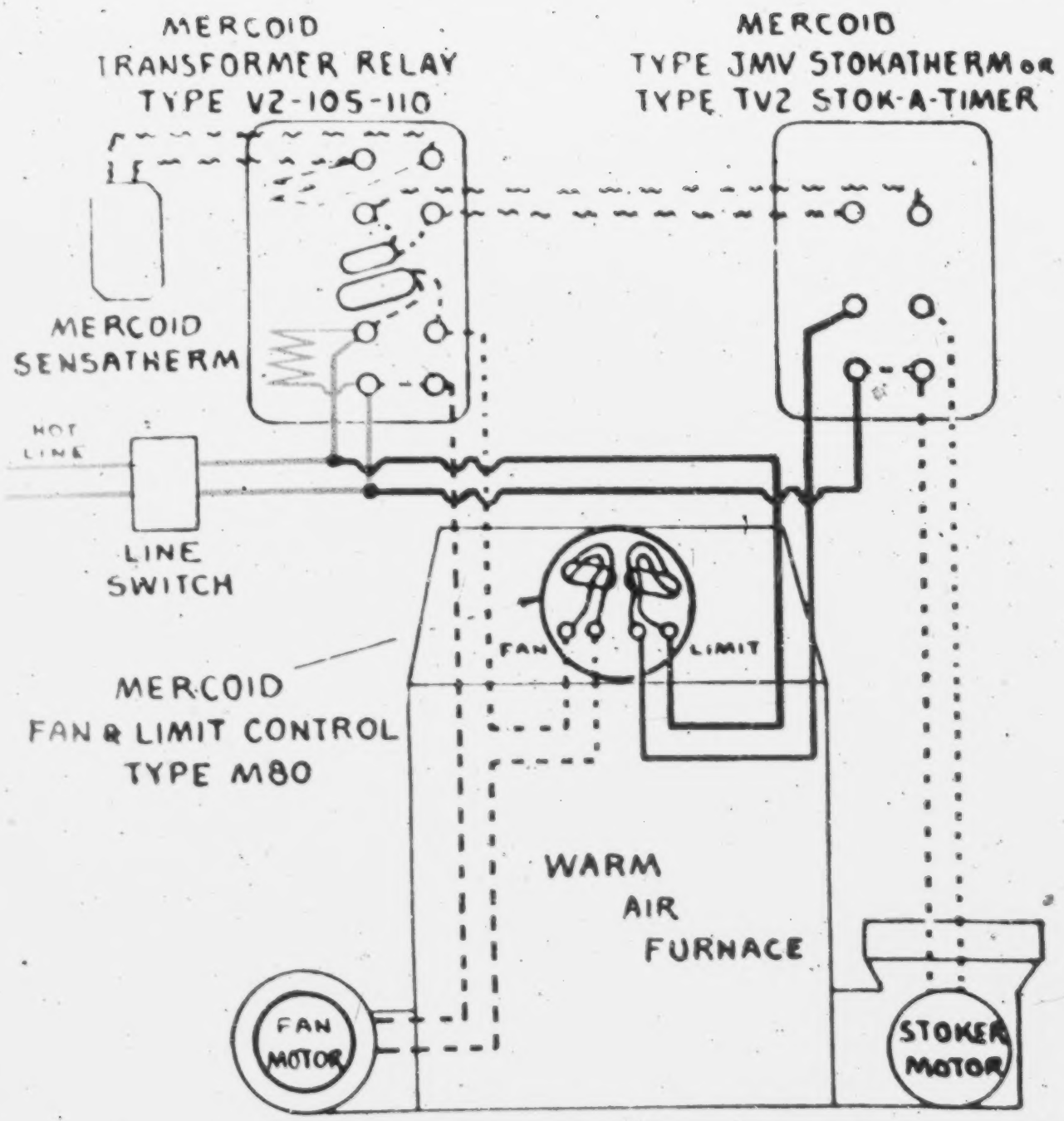
Relay deenergized

Limit switch closed

Fan switch closed

Stoker off

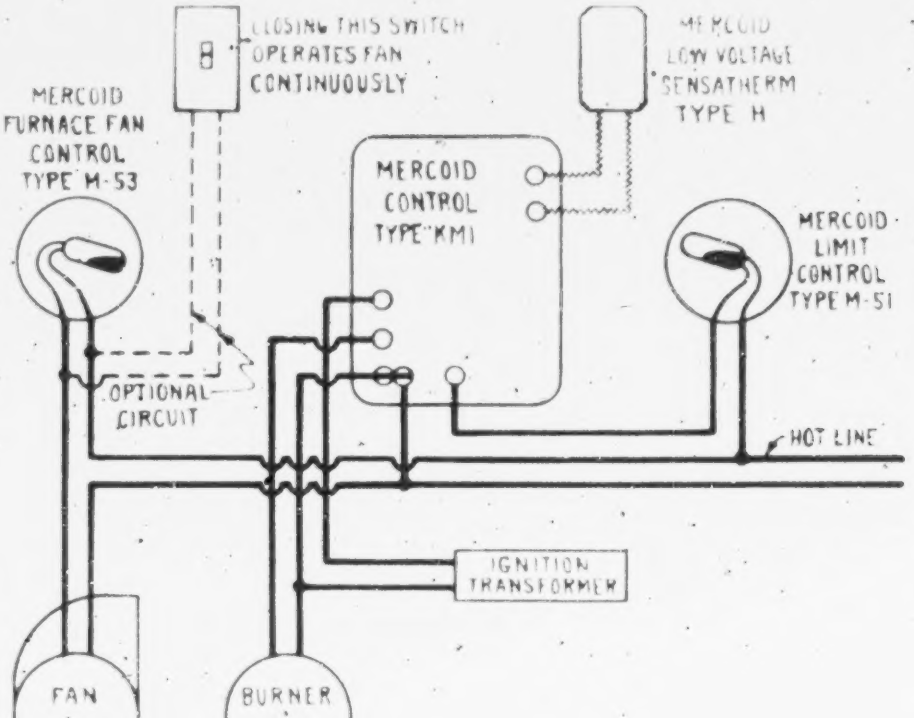
Fan off



POSITION 7: ROOM WARM - FURNACE COLD

Room thermostat off

Relay energized


CLOSING THIS SWITCH
OPERATES FAN
CONTINUOUSLY
MERCOID
LOW VOLTAGE
SENSATHERM
TYPE H
MERCOID
FURNACE FAN
CONTROL
TYPE M-53
MERCOID
CONTROL
TYPE KM1
MERCOID
LIMIT
CONTROL
TYPE M-51
OPTIONAL
CIRCUIT
HOT LINE
IGNITION
TRANSFORMER
FAN
BURNER



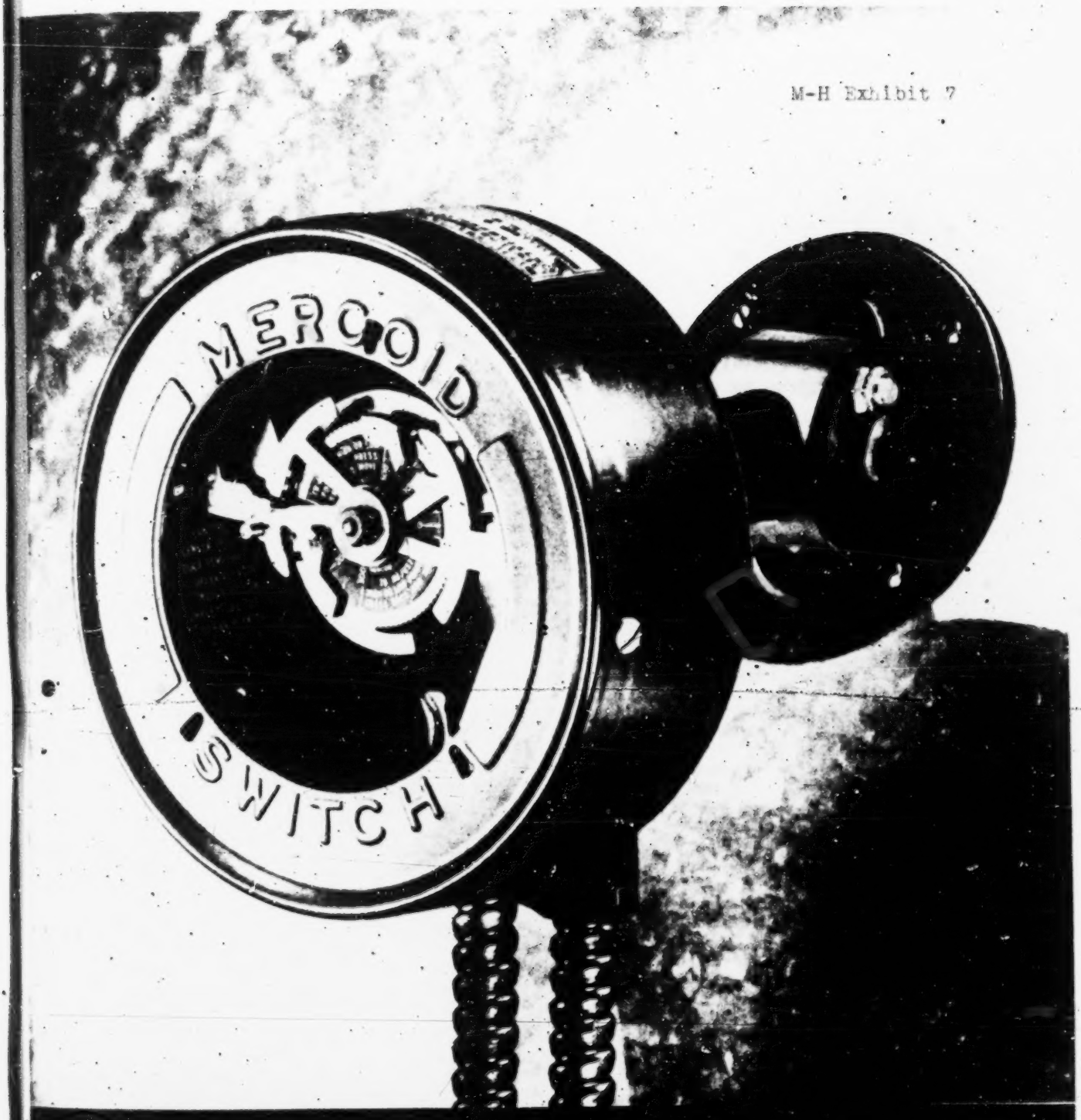
THE
MERCOID
CORPORATION
CHICAGO ILL USA

MERCOID

DWG NO. 962

M-H EXHIBIT 6

M-H Exhibit 7



MERCOID

COMBINATION FAN AND LIMIT CONTROL FOR WARM AIR FURNACES

MERCOID COMBINATION FAN AND LIMIT CONTROL

Heretofore all automatically fired warm air furnaces equipped with a fan or blower required two separate Mercoid Controls, but these controls may now be had in a single unit in the Mercoid Combination Fan and Limit Control, at a saving over the use of two instruments.

Why a Limit Control is Necessary

The function of a limit control is to protect the furnace from overheating. For example, if the thermostat should be subjected to a cold draft of air from an open window or door, it would cause the electrical circuit of the thermostat to remain closed and continue to call for heat until the cold draft is removed. In the meantime, the oil burner, stoker or gas burner (whatever the case may be) would operate at capacity and very likely result in overheating the furnace, but for the interception of the limit control, which is set at a high predetermined temperature to stop the operation of the heating equipment under such circumstances. However, as soon as the temperature drops to the low predetermined setting of the limit control, the burner will start again, and in this respect, the limit control functions as a thermostat until the abnormal condition surrounding the thermostat is corrected.

The Use of a Fan or Blower Control

The other control, widely used on warm air furnaces, is a fan or blower control, which regulates the operation of a fan or blower.

It is a fact that equipping a warm air furnace with a fan or blower increases the efficiency of the furnace and also economizes on fuel. That is why blower equipped furnaces are rapidly growing in popular favor. They also lend themselves to cooling or air conditioning applications during hot weather. For this type of application, the Mercoid Fan Control has been the accepted control by the trade.

Features of the Mercoid Combination Control

The Mercoid Combination Fan and Limit Control retains all of the outstanding features of the Mercoid Type M-53 Fan Control and Type M-51 Limit Control.

Temperature Indicating Dial

It has a red dial in plain view located at the center of the instrument. The dial is calibrated in Fahrenheit degrees with a scale in duplicate—one scale to each side of the dial. A temperature indicating pointer is provided for each scale to facilitate the reading of the temperature in the furnace hood or duct.

Being able to readily determine the duct temperature has proven to be a popular feature on Mercoid Furnace Controls. It serves the same purpose as a thermometer on boilers. This information enables one to check the proper size of the furnace fire and facilitates making necessary adjustments.

Simplified Double Adjustments

Both "high" and "low" adjustment levers are provided with pointers, which plainly show the operating settings of the fan and limit contol. All adjustments are easily made by simply pressing the finger on the respective levers and moving them to the desired setting as shown in Illustrations No. 1 and No. 2. As the finger is released, the setting is automatically locked in the tooth wheel as shown in Illustration No. 2.

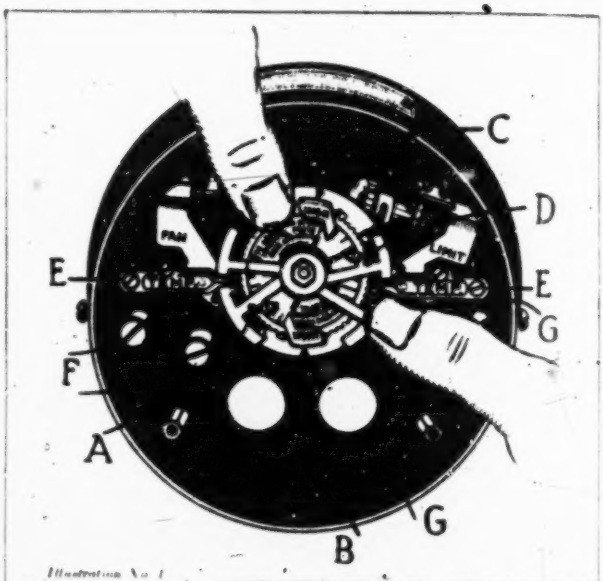


Illustration No. 1

Above illustration shows the detail construction of the control more clearly and the manner the operating adjustments are made. "A" and "B" are the adjustment levers for the fan switch to the left. "C" and "D" for the limit switch to the right. "E-E" temperature indicating pointers. "F" wiring terminals for fan switch. "G" wiring terminals for limit switch. The insulating shield which must be replaced after connections are made is not shown above.



Illustration No. 2.

This picture is a detailed illustration showing how the respective high and low adjustment pointers "W" and "X" are released from the tooth wheel while pressing adjustments to more than the required setting. "Y" and "Z" show how it automatically go back into the locking position.

Each lever adjustment is plainly marked, thereby eliminating any possible confusion when setting the operating temperatures for both the fan and limit switches in this control.

Mercury Contact Switches Used

An important consideration when selecting an automatic control is to note the type of switch used. The "making" and "breaking" of an electrical circuit of any control, must be positive to insure trouble-free performance, otherwise, it defeats its own purpose.



Fig. 5-51

Type of switch used in Mercoid Combination Fan and Limit Control

There are two hermetically sealed mercury switches used in the Mercoid Combination Control. The one located on the left side, is the fan switch, while the one to the right, is the switch for the limit control.

Mercoid Switches have a number of patented features, which make them outstanding in mercury switch construction. The utmost care and skill are exercised in the making of these switches. Selected material of given specifications must be used throughout. It is amazing to see the amount of detailed attention, operations, tests and inspections that Mercoid Switches are subjected to before they become a working part of a Mercoid Control.

Mercoid Switches cannot be affected by dust, dirt or corrosive gases. They are immune to any adverse surrounding conditions. Millions of these switches have been in the field over a long period of years and are working as perfect today, as when first installed. No cleaning of contacts, or other attention is ever required. There can be no open arcing, pitting of contacts, oxidation or deterioration.

Mercoid Switches are "built to endure," insuring reliable service indefinitely.

Adjustable Mounting Flange

Warm air furnaces usually have a sloping hood which is a characteristic construction, however there is a tendency towards straight-line jacket design in many of the present day types.

All instruments must be placed in a level position to insure proper operation. After a suitable location is determined according to the various field conditions, as shown in Illustration No. 3, a small hole, large enough to permit the insertion of the bimetal stem of the instrument, is cut into the sloped side of the hood.

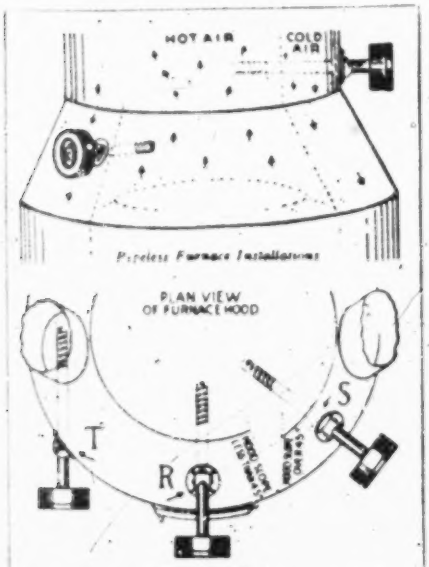


Illustration No. 3
The illustration above shows the flexibility of the adjustable flange in adapting the control to varying installation requirements. "T" shows a mounting where internal obstructions do not permit it to be placed on a radius from the center as shown with "R" and "S" which position is the usual practice.

The Mercoid Combination Fan and Limit Control is provided as standard with a special adjustable mounting flange, which makes it very easy to mount the control within a 30 to 90° angle and then lock it in a fixed position by means of a locking nut. See illustration No. 4.

Flat flange for mounting control on a flat surface and curved flanges for curved surfaces are available on order.

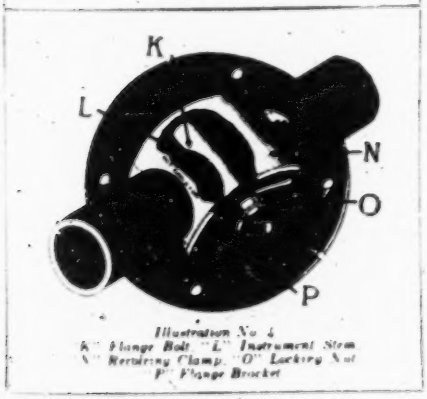


Illustration No. 4
"K" Flange Bolt "L" Instrument Stem "N" Retaining Clamp "O" Locking Nut "P" Flange Bracket

Control Operation

The method of operation of the Mercoid Combination Control is positive, simple and dependable.

The instrument is actuated by means of a helix shaped bimetal coil, which is constant in action, durable in construction and yet very sensitive in its response to temperature changes taking place in the furnace hood.

This bimetal coil serves a two-fold purpose by operating the control mechanism and giving an accurate furnace temperature reading on the dial of the instrument.

A rising temperature rotates the coil in one direction while a dropping temperature rotates it the opposite way. The end of the bimetal is fastened to a shaft, which turns with the coil and operates cams that throw the switches in the "off" and "on" position according to the predetermined settings of the control.

When the temperatures go beyond the control setting, the coil is permitted to turn freely without any strain on the bimetal, therefore, assuring accurate control performance over a long period of time.

Mercoid Fan and Limit Controls are sturdy in construction, compact and neat in appearance, easy to install and adjust. They give complete all around satisfaction.

Special Requirements Available on Order

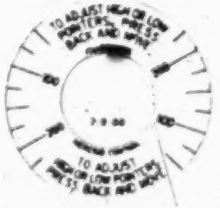
In localities where there are ordinances with certain temperature limiting codes that must be complied with, we can furnish stops on the dial, which prevent the adjustment from being set above the specified temperature limitation.

Certain localities require a barrier on a combination control, to keep the high voltage wiring connection separated from the low voltage wires, where both low and high voltage wires come into the same instrument as may be the case when the control is used with a fan and damper motor. The barrier may be applied in the field, and is available upon order.

The Mercoid Combination Fan and Limit Control is available in two different ranges, each having a separate type number as shown in the following illustrations:



The illustration above shows dial with range from 50—300° as used on Type M-80.



The illustration above shows dial with range from 50—225° as used on Type M-82.

List Price

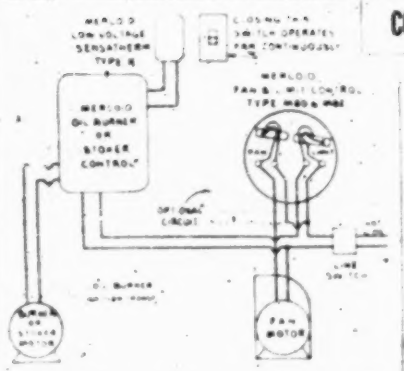
Both instruments are standard for either A.C. or D.C. 10 amp. 110V., 4 amp. 220V., motor rating 1.H.P. Repulsion-Induction. ½ H.P. D.C. 110 or 220V., D.C. and ½ H.P. split phase.

Type M-80	Range	50—300° F.	15.00
Type M-82	Range	50—225° F.	16.00

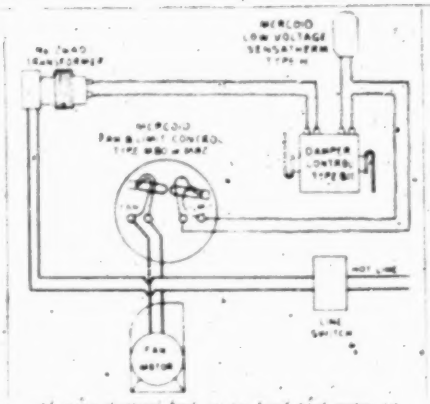
Shipping weight approximately 6 lbs.

Wiring Diagrams shown on next page

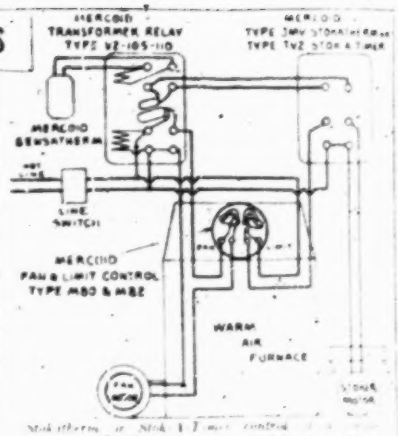
COMBINATION CONTROL WIRING DIAGRAMS



Fan hook up in connection with oil or stoker fired warm air furnace closing optional circuit operates fan continuously for ventilating purposes during summer
With this hook up after the thermostat is satisfied the fan will continue to run until temperature in the furnace bonnet drops to the control setting



Showing electrical hook up on a hand fired warm air system employing circulating fan and thermostatically operated damper control



With thermostat on Stok-A-Timer control [illegible] phase stoker and circulating fan motors on same system. When Sensatherm calls for heat stoker starts but fan does not start until furnace is heated to [illegible] temperature. Sensatherm opens [illegible] and stoker motor stops

OTHER MERCOID CONTROLS FOR VARIOUS WARM AIR FURNACE APPLICATIONS

Whether a warm air furnace has a motor driven damper regulator, automatic oil burner, stoker, or gas burner, a thermostat is used in common on all of the above types of automatic heating equipment.

It is the purpose of the thermostat to stop and start the heating plant in order to maintain an even room temperature in accordance with the setting of the instrument. In this respect, the thermostat is the master control of the heating system and should be selected with care and discrimination, to assure uninterrupted comfort in the home.

The Mercoid Sensatherm meets the most exacting requirements of a room thermostat as it is extremely sensitive and requires no artificial acceleration to keep the home uniformly heated.

It is small in size, neat in appearance and mechanically perfect. The mercury switch used in this temperature control is a positive protection against contact trouble and will operate indefinitely without trouble.

In design and finish, the Sensatherm harmonizes with any scheme of interior decoration.



SENSATHERM

MERCOID DAMPER CONTROL SETS

The Mercoid Damper Control is designed for reliable automatic regulation of draft and check dampers of heating plants, and is especially recommended for operating duct dampers of zone controlled air conditioning systems.

The popular standard set consists of: Type H Sensatherm, B-11 Damper Control, 110V., 50-60 cycle Transformer and a complete set of accessories ready for installation. Other sets available.



DAMPER CONTROL



LIMIT CONTROL

SEPARATE LIMIT OR FAN CONTROLS

The Type M-53 Mercoid Fan Control is very popular with the warm air heating trade. Thousands of these controls are in use, giving satisfactory service. This control has a dial and pointer, which plainly indicates the temperature in the furnace hood. It is equipped with a dust-proof sealed mercury contact switch to insure dependable operation at all times. The "high" and "low" operating adjustments are easy to make.

A flange is provided to facilitate installations on different hood angles.

The Mercoid Type M-51 Limit Control has all of the outstanding features of the fan control.



FAN CONTROL



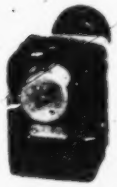
TYPE KMI

WHERE OIL BURNERS ARE USED

Warm air furnaces automatically fired by an oil burner, require the addition of a safety control to provide protection against flame or ignition failure. The Mercoid KM and KMI Pyratherms are tried and proven safety controls, constructed to give positive protection under all operating conditions. In event of any abnormal conditions, these controls always check to the safe side and stop the burner. Provisions are also made for low voltage protection. These controls are equipped throughout with sealed mercury contact switches to insure years of dependable service. Type KMI (illustration to the left) is for use on burners employing intermittent ignition. Type KM (illustrated to right) is for use on burners with constant ignition. Thousands of these controls are out in the field giving complete satisfaction under varying operating conditions.



TYPE KM



STOKATHERM

WHERE STOKERS ARE USED

Warm air furnaces fired by a coal stoker require a control to regulate and maintain a low fire while the thermostat is not calling for heat.

The Mercoid Stokatherm has features not found in other stoker controls. It does not depend upon any fixed stack temperature or fixed timing, but in maintaining the fire employs both methods in a new principle of operation. The operation of the control in maintaining the fire is determined by the condition of the fire itself, thus making it possible to maintain a very low fire during this period. Overheating is prevented and fuel is economized. The Stokatherm is for use on anthracite stokers and also for stokers burning a non-coking bituminous coal. This control also has an out-fire feature which prevents feeding coal should the fire go out.

The Mercoid Stok-A-Timer is an improved timer type control and may be used on all types of stokers. It prevents the stoker from operating immediately after the thermostat shuts off. This control is extremely simple to adjust by merely moving a lever over a calibrated dial to the required setting. No tools are required.



STOK-A-TIMER

THE MERCOID CORPORATION • General Office and Factory, 4201 BELMONT AVE., CHICAGO, ILL.
New York Office: 90 WEST STREET • Philadelphia Office: 3137 N. BROAD ST. • Boston Office: 85 IVY STREET • Distributors in All Principal Cities

Bulletin M-12

IT PAYS TO GET THE BEST

MERCOID
AUTOMATIC CONTROLS

FOR HEATING, AIR CONDITIONING, REFRIGERATION AND VARIOUS TYPES OF INDUSTRIAL APPLICATIONS

CATALOG NUMBER 300

PRICES* EFFECTIVE MAY 1, 1939

Subject to Change Without Notice

ABC FIVE LETTER CODE-FIFTH EDITION USED IN THIS CATALOG



THE MERCOID CORPORATION

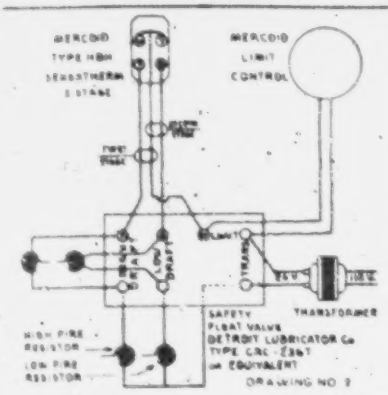
MAIN OFFICE AND FACTORY • 4201 BELMONT AVE • CHICAGO, ILL., U.S.A.

NEW YORK OFFICE 330 W. 34th ST. • PHILADELPHIA OFFICE 3137 N. BROAD ST. • BOSTON OFFICE 75 BUSWELL ST.

Sole Manufacturers of The Mercoid Switch

M-H EXHIBIT 9

WIRING DIAGRAMS APPLYING TO MERCOID TWO-STAGE SENSATHERMS



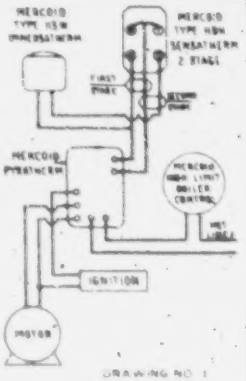
DRAWING NO. 2

Above diagram covers a typical hook up of two stage thermostatic control of high low fire vaporizing type oil burner. When room temperatures are low both circuits of the Sensatherm are closed and the burner operates at high fire. As the temperature rises the first stage circuit opens and burner goes to low fire operation. If the temperature continues to rise, the second stage circuit opens cutting down the fire to only the pilot flame.

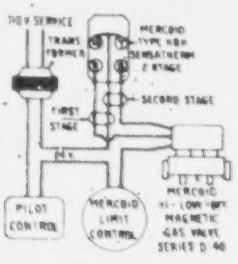
The hook up shown provides a method of control which minimizes room temperature stratification.

The first stage of the Type HSH Sensatherm is directly connected to the Mercoid Pyratherm and normally operates the burner to maintain the desired room temperature.

Room temperature stratification is minimized by maintaining a constant circulation of hot water thru the system. This is accomplished by connecting the Type 115W immersatherm (installed in radiator or return) in series with the second stage of the Sensatherm. During periods when temperatures of the heating line are normal (1st stage circuit open) should the water temperature get low, the Type 115W immersatherm will cause the burner to operate to ensure that circulation will continue. During very cold weather, should the sustained low temperature of the water cause the room temperature to increase above normal, the second stage of the Sensatherm will open, thus preventing further operation of the burner and eliminating overheating.

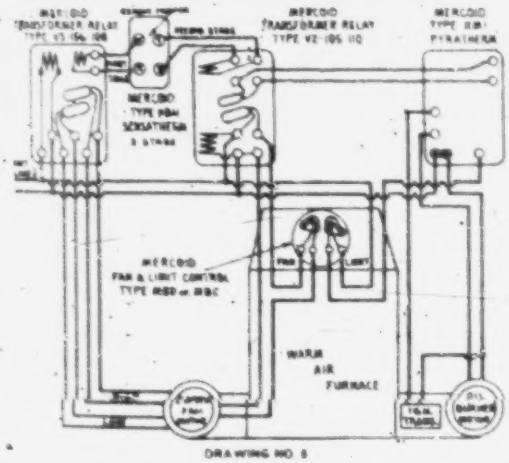


DRAWING NO. 1



DRAWING NO. 4

Above diagram covers a typical hook up of two stage thermostatic control of high low fire gas burners. When room temperatures are low both circuits of the Sensatherm are closed and the gas burner operates at high fire. As the room temperature rises to the thermostat setting the 1st stage circuit opens, which causes the major part of gas valve to close. If temperature continues to rise, the 2nd stage circuit opens and the valve closes completely cutting burner down to only the pilot flame.



DRAWING NO. 5

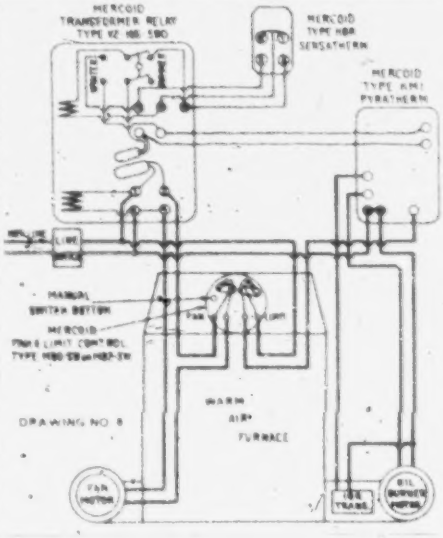
In the past it has been common practice to control two speed forced warm air systems from changes of bonnet temperature. The above diagram covers an application where the operation of the heating equipment, as well as the two speeds of the fan are regulated from the room thermostat.

This particular diagram covers an oil fired system, however the same general hook up is also adaptable to stoker fired or gas fired equipment. A typical hook up is shown on the connections of the two speed fan motor. This hook up may vary with different makes of motors, however the relays shown may generally be employed.

When the room temperature is low, both circuits of the two stage Sensatherm are closed. This causes the burner to operate. The fan also will operate at high speed if the furnace is up to temperature (fan switch closed). As the temperature rises, the 1st stage circuit of the thermostat opens and causes the fan motor to operate at low speed. The burner will continue to operate but if excessive temperature is generated at the furnace, due to the fan operating only at low speed, the limit control will stop the burner. If the room temperature should continue to rise, the 2nd stage circuit of the thermostat will open and stop both the burner and circulating fan. On a drop in room temperature, the 2nd stage thermostat circuit closes which starts the burner and operates the fan at low speed. If the heat demand is low, the room temperature will be maintained by the fan operating at low speed, however, should the room temperature continue to drop the 1st stage circuit of the thermostat will close and operate the fan at high speed.

Relay, Type V2-105-590 has a built-in toggle switch which fits through the cover. When the relay is in the "Winter" position, the heating circuit of Sensatherm HBR controls the operation of both the burner motor and circulating fan. When the room temperature is below the setting of the Sensatherm the burner will operate continuously, unless the furnace bonnet reaches the temperature at which the limit control is set. When the bonnet reaches the temperature for which the fan switch is set, the fan will "operate but will stop immediately when the room reaches the required temperature.

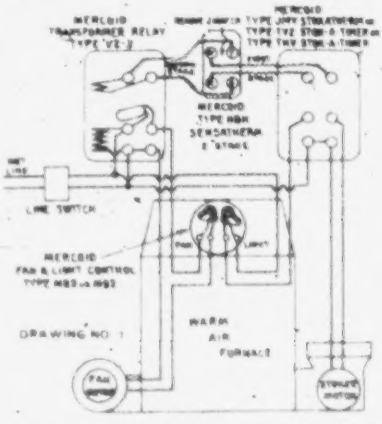
By throwing the toggle switch of the relay to the "Summer" position the low voltage circuit to the HMI Pyratherm is opened so that the burner cannot operate. At the same time the cooling circuit of the HBR Sensatherm is connected to Relay Type V2-105-590. By closing the summer switch on the fan control, the fan will operate at any time the room temperature is above the Sensatherm setting.



DRAWING NO. 8

Diagram to right covers the application of a two stage thermostat on a stoker fired warm air system with forced circulation. The thermostat independently controls the operation of both the stoker and circulating fan. When the room temperature is low both circuits of the thermostat are closed causing both the stoker and circulating fan to operate. As the temperature rises, the first stage circuit of the thermostat stops the stoker but the fan continues to operate. If the temperature continues to rise, the second stage circuit of the thermostat opens and stops the fan. When the temperature begins lowering the fan alone starts operating (stoker does not operate) and if the temperature again rises the fan stops. The fan continues operating intermittently and alone, unless temperatures continue to drop, when the stoker is again started.

The Fan Switch prevents operation of the fan, and circulation of cold air, whenever the furnace is not up to temperature. The Limit Switch stops the stoker, at any time temperatures at the furnace become excessive. The Stok-A-Timer can operate, to prevent the stoker fire going out, at any time the thermostat circuit remains open.



DRAWING NO. 7

WARM AIR FURNACE CONTROLS

EQUIPPED WITH THE MERCOID SEALED MERCURY CONTACT SWITCH

TYPE M-51 MERCOID WARM AIR LIMIT CONTROLS



TYPE M-51

The Mercoid Warm Air Limit Control is neat in appearance and is sturdily constructed throuout to render long and dependable service in the field. Its use is recommended on all furnace installations to prevent overheating.

The Mercoid switch is of the enclosed mercury contact type. It is not subject to open arcing, corrosion, oxidation, or pitting and will operate indefinitely without deterioration. The mechanism of this control has many outstanding features. The dial, located in the center of the instrument, slowly rotates as the temperature on the bi-metal coil increases or decreases. This dial is clearly calibrated in degrees Fahrenheit, and a pointer indicates the temperature in the furnace or duct,—enabling the installation or service men to check the proper size of fire.

A simple double adjustment is provided for setting both the "high" and "low" operating points. The range can be adjusted over the entire scale, and the differential can be set for very close operation, or may be widened to meet any field requirements.

The flange provided permits mounting of this control on any furnace hood, as it is adjustable for any angle between 30 and 90 degrees. Easily installed by means of the four sheet metal screws provided.



SIDE VIEW

SPECIFICATIONS

TYPE M-51: Available in standard ranges 25 to 300°F., or 50 to 500°F. Recommended as limit control on installations where minimum temperature codes are not in effect. Single pole—circuit opens on rise in temperature.

TYPE M-51D: Recommended on all installations where local code requirements or The National Board of Fire Prevention and A.G.A. specifications are enforced. Stop pins on dial prevent setting cut-out temperature higher than 200°F. Range adjustable 25 to 200°F. Single pole—circuit opens on rise in temperature.

TYPE M-52L: Two circuit low voltage—one circuit opens as other circuit closes. Recommended for use with 3 wire damper motors or other series "20" equipment. Capacity 5 amp.—25 volt. Standard range 50 to 500°F.

AIR CONDITIONING TYPES: Where an air conditioning installation must conform to National Board of Fire Underwriters' regulations (Rule 172 pamphlet 90) for the prevention of propogation of fire thru ducts passing thru fire walls, refer to Types M-51S and M-51R (page 20) which have been especially designed for this service.

ELECTRICAL CAPACITY: Standard single pole instruments, 10 amp. 115V., 5 amp. 230V. (Available on special order 3 amp. 440V.—add to list $3.00).

MOTOR RATING: 1 H.P. Repulsion-Induction, ½ H.P. Split Phase or D.C.

SPECIAL CIRCUITS: Available double pole or two circuit—see page 45 for ordering data and addition to list price.

TYPE NO	RANGE ADJ	CODE	LIST PRICE
M-51	25-300° F.	utoow	$8.00
M-51	50-500° F.	utopx	8.00
M-51D	50-200° F.	utoqy	8.00
M-52L	50-500° F.	utosa	8.00

With Centigrade graduations — Code "utnn" — No extra charge

Shipping weight approx. 5 lbs.

TYPE M-53 MERCOID WARM AIR FAN CONTROL



TYPE M-53

The Mercoid Warm Air Fan Control is neat in appearance and is sturdily constructed throuout to render long and dependable service in the field. Its use is recommended to control the operation of air circulating or booster fans. This instrument operates the fan economically and prevents blowing cold air into the room if furnace is not hot enough to deliver heat.

The Mercoid switch is of the enclosed mercury contact type. It is not subject to open arcing, corrosion, oxidation, or pitting and will operate indefinitely without deterioration. The mechanism of this control has many outstanding features. The dial, located in the center of the instrument, slowly rotates as the temperature on the bi-metal coil increases or decreases. This dial is clearly calibrated in degrees Fahrenheit, and a pointer indicates the temperature in the furnace or duct,—enabling the installation or service men to check the fan operation.

A simple double adjustment is provided for setting both the "high" and "low" operating points. The range can be adjusted over the entire scale, and the differential can be set for very close operation, or may be widened to meet any field requirements.

The flange provided permits mounting of this control on any furnace hood, as it is adjustable for any angle between 30 and 90 degrees. Easily installed by means of the four sheet metal screws provided.

SPECIFICATIONS

TYPE M-53: Standard ranges 25 to 300°F., or 50 to 500°F. Circuit closes as temperature rises. Recommended for installations where minimum temperature codes are not in effect.

TYPE M-53D: Recommended on all installations where local code requirements or The National Board of Fire Prevention and A.G.A. specifications are enforced. Stop pins on dial prevent setting fan cut-in temperature higher than 175°F. Range adjustable 25 to 175°F. Circuit closes as temperature rises.

TYPE M-53SW: Same as Type M-53 except is equipped with lock type manual switch button. Turning button locks switch in "on" position and permits operation of fan during summer months for ventilating purposes. When furnace is again fired and temperature rises, manual switch automatically unlatches and restores control to normal operation. Standard ranges 25 to 300°F., or 50 to 500°F. Circuit closes as temperature rises.

TYPE M-53SWD: Combination of Type M-53SW and M-53D listed above. Stop pins on dial prevent setting fan cut-in temperature higher than 175°F., and summer switch is included. Range adjustable 25 to 175°F. Circuit closes as temperature rises.

ELECTRICAL CAPACITY: Standard single pole instruments, 10 amp. 115V., 5 amp. 230V. either A.C. or D.C. (Available on special order 3 amp. 440V.—add to list $3.00).

MOTOR RATING: 1 H.P. Repulsion-Induction, ½ H.P. Split Phase or D.C.

SPECIAL CIRCUITS: Available double pole or two circuit—see page 45 for ordering data and addition to list price.

TYPE NO	RANGE ADJ	CODE	LIST PRICE
M-53	25-300° F.	utotb	$8.00
M-53	50-500° F.	utouc	8.00
M-53D	25-175° F.	utovd	8.00
M-53SW	25-300° F.	utowe	8.50
M-53SW	50-500° F.	utoxf	8.50
M-53SWD	25-175° F.	utoyg	8.50

With Centigrade graduations — Code "utnn" — No extra charge

Shipping weight approx. 5 lbs.

COMBINATION FAN AND LIMIT WARM AIR CONTROLS

EQUIPPED WITH THE MERCOID SEALED MERCURY CONTACT SWITCH



TYPE M-80



SIDE VIEW TYPE M-80 SHOWING ADJUSTABLE FLANGE



STRAIGHT NON-ADJUSTABLE MOUNTING FLANGE

TYPE M-80 COMBINATION FAN AND LIMIT CONTROL —WITH SUMMER SWITCH

Four Adjustments provided for Independently Setting the Cut-in and Cut-out Temperatures of Both the Fan and Limit Switches.

The Type M-80 Mercoid Warm Air control is a duplex instrument, combining within one case all of the well known field proven features of the Type M-51 Limit Control and the Type M-53 Fan Control. This instrument is recommended for air conditioning systems or other warm air applications employing forced circulation and automatic heating equipment. The limit switch opens its circuit on rising temperatures and protects the furnace against overheating. The fan switch, which closes its circuit on rising temperatures, regulates the operation of the fan and prevents blowing cold air into the rooms if the furnace is not hot enough to deliver heat.

The mechanism of this control has many outstanding features. A red dial, located in the center of the instrument, slowly rotates as the temperature changes on the bimetal coil. This dial is clearly calibrated in Fahrenheit degrees with a scale in duplicate—one scale for the limit switch settings, the other for the fan switch settings. A temperature indicating pointer is provided which indicates, on the graduated dial, the temperature in the furnace or duct. Serving the same purpose as a thermometer this temperature indicator enables installation or service men to check the proper size of fire when making necessary adjustments.

Four simple adjustments are provided for independently setting the cut-in and cut-out temperatures of both the fan and limit switches. The differentials can be set for very close operation or can be widened to meet any field requirement.

The Mercoid enclosed mercury contact switches are not subject to open arcing, corrosion, oxidation or pitting and operate indefinitely without deterioration.

This instrument is provided as standard with a special adjustable flange which permits mounting on any furnace hood, where the angle is from 30 to 90 degrees. Easily installed by means of four sheet metal screws provided. For air conditioning units with flat surfaces, can be furnished on special order with flat non-adjustable flange as illustrated at reduced cost when ordered in quantities—Prices on application.

ALL TYPES STANDARD WITH SUMMER SWITCH

All Combination Controls are furnished standard with lock type manual switch button. Turning button locks fan switch in "on" position and permits operation of fan during summer months for ventilating purposes. When furnace is again fired and temperature rises, manual switch automatically unlatches and restores control to normal operation.

LINE VOLTAGE INSTRUMENTS

The following instruments are for general applications where the limit switch and fan switch are required to directly control motors at line voltage.

TYPE M-80—For general applications. Range adjustable from 50 to 300° F.

TYPE M-82—For general applications requiring very close differentials. This instrument is equipped with longer bi-metal operating coil for more sensitive operation. Range adjustable from 50 to 225° F.

TYPE M-84—Complies with A.G.A. ruling and Detroit ordinance limiting operating temperatures of warm air furnaces. Equipped with long sensitive bi-metal coil but stop pins are provided which limit Fan Switch adjustments to 175° F. and Limit Switch adjustments to 200° F.

LINE VOLTAGE FAN SWITCH—LOW VOLTAGE LIMIT SWITCH

The following instruments are for applications where the fan is to be directly controlled at line voltage and where the limit switch is to control low voltage equipment such as gas valves, damper controls etc. As both line voltage and low voltage enter the same case a steel barrier with low voltage cable clamp is provided between the terminal posts in accordance with requirements of Underwriter's Laboratories, Inc.

TYPE M-80B—Same as Type M-80 except with barrier. Range 50 to 300° F.

TYPE M-82B—Same as Type M-82 except with barrier. Range 50 to 250° F.

TYPE M-84B—Same as Type M-84 except with barrier. Fan switch range 50 to 175° Limit switch 50 to 200° F.

ELECTRICAL CAPACITY (Each Circuit): 10 amp. 115 Volt, 5 amp. 230 Volt A.C. or D.C.

MOTOR RATING (Each Circuit): 1 H.P. Repulsion Induction, ¼ H.P. Split Phase or D.C.

LINE VOLTAGE CONTROLS

TYPE NO	RANGE ADJ	CODE	LIST PRICE
M-80	50 to 300°	uvfuh	$11.00
M-82	50 to 225°	uvfvi	12.00
M-84	Fan 50 to 175° Limit 50 to 200°	uvfyl	12.00

LINE VOLTAGE—LOW VOLTAGE

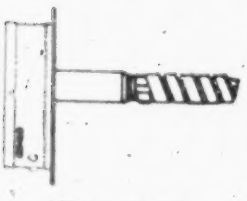
TYPE NO	RANGE ADJ	CODE	LIST PRICE
M-80B	50 to 300°	uvfzm	$11.00
M-82B	50 to 225°	uvgac	12.00
M-84B	Fan 50 to 175° Limit 50 to 200°	uvgbd	12.00

Furnished standard with adjustable mounting flange. Can be furnished to manufacturers on special order with non-adjustable flat flange at reduced cost when ordered in quantities—Prices on application.

Shipping weight approx 6 lbs.



TYPE M-80F



SIDE VIEW TYPE M-80F

TYPE M-80F COMBINATION FAN AND LIMIT CONTROL

WITH FLANGED CASE FOR DIRECT ATTACHMENT TO FURNACE JACKETS

Type M-80F Mercoid Combination Fan and Limit Controls incorporate the summer switch as well as all of the desirable adjustment features of the Type M-80 listed above. They are, however, supplied with flanged case for direct attachment to furnace jackets. Type M-80F controls are especially recommended for use in connection with furnace burner units which have a flat vertical surface. The appearance of the furnace is greatly improved by the flange mounting and all wiring is concealed behind the furnace jacket.

STANDARD FINISH: Hard Rubber black enamel.

SPECIAL FINISHES: To manufacturers requiring quantities the Type M-80F can be furnished with special finish to match furnace jacket. Prices on application.

STANDARD SLEEVE LENGTH: Standard stock instruments have an overall length from the back of the instrument case to the end of the bimetal coil as follows: Types M-80F and M-80BF—3 inches. Types M-84F and M-84BF—4 inches. Available to manufacturers in quantities with special sleeve lengths as desired. Prices on application.

LINE VOLTAGE INSTRUMENTS

The following instruments are for general applications where the limit switch and fan switch are required to directly control motors at line voltage.

TYPE M-80F—For general applications. Range adjustable from 50 to 300°F.

TYPE M-84F—Complies with A.G.A. ruling as well as Detroit ordinance limiting the operating temperatures of warm air furnaces. Equipped with long sensitive bi-metal coil but stop pins are provided which limit Fan Switch adjustments to 175° F. and Limit Switch adjustments to 200° F.

LINE VOLTAGE FAN SWITCH—LOW VOLTAGE LIMIT SWITCH

The following instruments are for applications where the fan is to be directly controlled at line voltage and where the limit switch is to control low voltage equipment such as gas valves, damper controls etc. As both line voltage and low voltage enter the same case a steel barrier with low voltage cable clamp is provided between the terminal posts in accordance with requirements of Underwriter's Laboratories, Inc.

TYPE M-80BF—Same as Type M-80F except with barrier. Range 50 to 300°F.

TYPE M-84BF—Same as Type M-84F except with barrier. Fan switch range 50 to 175° Limit switch 50 to 200°F.

ELECTRICAL CAPACITY AND MOTOR RATING same as Type M-80 shown above.

LINE VOLTAGE CONTROLS

TYPE NO	RANGE ADJ	CODE	LIST PRICE
M-80F	50 to 300°	uvgce	$10.25
M-84F	Fan 50 to 175° Limit 50 to 200°	uvgeg	11.25

LINE VOLTAGE—LOW VOLTAGE

TYPE NO	RANGE ADJ	CODE	LIST PRICE
M-80BF	50 to 300°	uvggi	$10.25
M-84BF	Fan 50 to 175° Limit 50 to 200°	uvgik	11.25

NOTE: Special net prices quoted manufacturers requiring quantities.

Shipping weight approx 6 lbs.

MERCOID

AUTOMATIC CONTROLS

FOR HEATING, AIR CONDITIONING, REFRIGERATION

AND VARIOUS TYPES OF INDUSTRIAL APPLICATIONS

CATALOG NUMBER 400

PRICES EFFECTIVE FEBRUARY 1, 19[illegible]
Subject to Change Without Notice

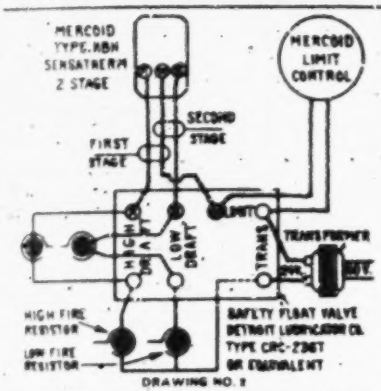
CABLE ADDRESS: MERCOID CHICAGO
CODE: ABC FIVE LETTER FIFTH EDITION



THE MERCOID CORPORATION
MAIN OFFICE AND FACTORY • 4201 BELMONT AVE. • CHICAGO, ILL., U.S.A.
NEW YORK OFFICE 330 W. 34th ST. • PHILADELPHIA OFFICE 3237 N. BROAD ST. • BOSTON OFFICE 230 BEACON ST.
Sole Manufacturers of The Mercoid Switch

M-M EXHIBIT [illegible]

WIRING DIAGRAMS APPLYING TO MERCOID TWO-STAGE SENSATHERMS



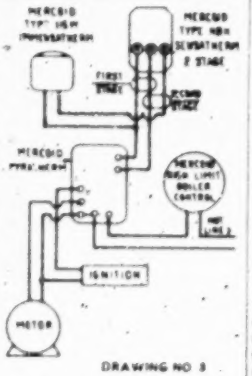
DRAWING NO. 2

Above diagram covers a typical hook-up of two stage thermostatic control of high-low fire vaporizing type oil burners. When room temperatures are low both circuits of the Sensatherm are closed and the burner operates at high fire. As the temperature rises the first stage circuit opens and burner goes to low fire operation. If the temperature continues to rise, the second stage circuit opens cutting down the fire to only the pilot flame.

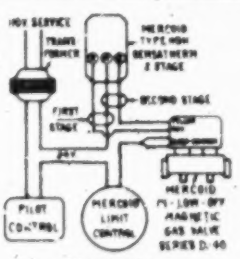
The hook-up shown provides a method of control which minimizes room temperature stratification.

The first stage of the Type HBH Sensatherm is directly connected to the Mercoid Pyratherm and normally operates the burner to maintain the desired room temperature.

Room temperature stratification is minimized by maintaining a constant circulation of hot water thru the system. This is accomplished by connecting the Type 115W Immersatherm (installed in radiator or return) in series with the second stage of the Sensatherm. During periods when temperatures at the breathing line are normal (1st stage circuit open), should the water temperature get low, the Type 115W Immersatherm will close its circuit and the burner will operate to increase the water temperature so that circulation will continue. During very mild weather, should this sustained low temperature at the radiators cause the room temperature to increase 1° above normal, the second stage of the Sensatherm will open, thus preventing further operation of the burner and eliminating overheating.

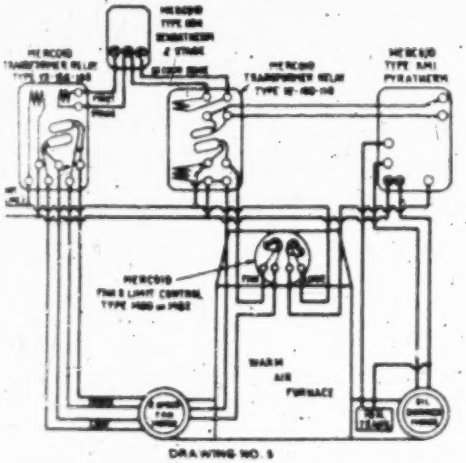


DRAWING NO. 3



DRAWING NO. 4

Above diagram covers a typical hook-up of two-stage thermostatic control of high-low fire gas burners. When room temperatures are low both circuits of the Sensatherm are closed and the gas burner operates at high fire. As the room temperature rises to the thermostat setting the 1st stage circuit opens, which causes the main port of gas valve to close. If temperature continues to rise, the 2nd stage circuit opens and the valve closes completely cutting burner down to only the pilot flame.



DRAWING NO. 5

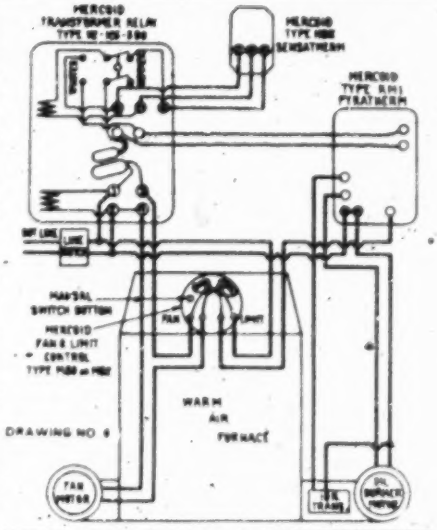
In the past it has been common practice to control two speed fans on warm air systems from changes of bonnet temperature. The above diagram covers an application where the operation of the heating equipment, as well as the two speeds of the fan are regulated from the room thermostat.

This particular diagram covers an oil fired system, however, the same general hook-up is also adaptable to stoker fired or gas fired equipment. A typical hook-up is shown in the connections to the two speed fan motor. This hook-up may vary with different makes of motors, however, the relays shown may generally be employed.

When the room temperature is low, both circuits of the two stage Sensatherm are closed. This causes the burner to operate. The fan also will operate at high speed if the furnace is up to temperature (fan switch closed). As the temperature rises, the 1st stage circuit of the thermostat opens and causes the fan motor to operate at low speed. The burner will continue to operate but if excessive temperature is generated at the furnace, due to the fan operating only at low speed, the limit control will stop the burner. If the room temperature should continue to rise, the 2nd stage circuit of the thermostat will open and stop both the burner and circulating fan. On a drop in room temperature, the 2nd stage thermostat circuit closes which starts the burner and operates the fan at low speed. If the heat demand is low, the room temperature will be maintained by the fan operating at low speed, however, should the room temperature continue to drop the 1st stage circuit of the thermostat will close and operate the fan at high speed.

Relay Type V2-105-590 has a built-in toggle switch projecting through the cover. When thrown to the "Winter" position the heating circuit of Sensatherm HBR controls the operation of both the burner, motor and circulating fan. When the room temperature is below the setting of the Sensatherm the burner will operate continuously unless the furnace bonnet reaches the temperature at which the limit control is set. When the bonnet reaches the temperature for which the fan switch is set, the fan will operate but will stop immediately when the room reaches the required temperature.

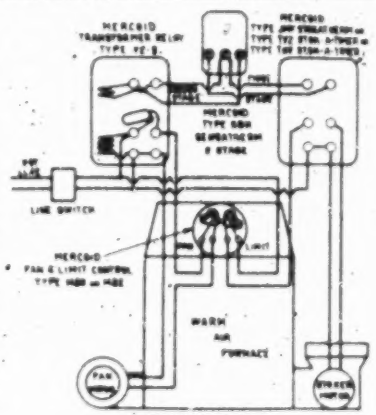
By throwing the toggle switch of the relay to the "Summer" position the low voltage circuit to the KMI Pyratherm is opened so that the burner cannot operate. At the same time the cooling circuit of the HBR Sensatherm is connected to Relay Type V2-105-590. By closing the summer switch on the fan control, the fan will operate at any time the room temperature is above the Sensatherm setting.



DRAWING NO. 6

Diagram to right, covers the application of a two stage thermostat on a stoker fired warm air system with forced circulation. The thermostat independently controls the operation of both the stoker and circulating fan. When the room temperature is low both circuits of the thermostat are closed causing both the stoker and circulating fan to operate. As the temperature rises, the first stage circuit of the thermostat stops the stoker but the fan continues to operate. If the temperature continues to rise, the second stage circuit of the thermostat opens and stops the fan. When the temperature begins lowering the fan alone starts operating (stoker does not operate) and if the temperature again rises the fan stops. The fan continues operating intermittently and alone, unless temperatures continue to drop when the stoker is again started.

The Fan Switch prevents operation of the fan and circulation of cold air, whenever the furnace is not up to temperature. The Limit Switch stops the stoker at any time temperatures at the furnace become excessive. The Stok-A-Timer can operate, to prevent the stoker fire going out, at any time the thermostat circuit remains open.



DRAWING NO. 7

WARM AIR FURNACE CONTROLS

EQUIPPED WITH THE MERCOID SEALED MERCURY, CONTACT SWITCH



TYPE M-51



SIDE VIEW

TYPE M-51 MERCOID WARM AIR LIMIT CONTROLS

The Mercoid Warm Air Limit Control is neat in appearance and is sturdily constructed thruout to render long and dependable service in the field. Its use is recommended on all furnace installations to prevent overheating.

The Mercoid switch is of the enclosed mercury contact type. It is not subject to open arcing, corrosion, oxidation, or pitting and will operate indefinitely without deterioration. The mechanism of this control has many outstanding features. The dial, located in the center of the instrument, slowly rotates as the temperature on the bi-metal coil increases or decreases. This dial is clearly calibrated in degrees Fahrenheit, and a pointer indicates the temperature in the furnace or duct,—enabling the installation or service men to check the proper size of fire.

A simple double adjustment is provided for setting both the "high" and "low" operating points. The range can be adjusted over the entire scale, and the differential can be set for very close operation, or may be widened to meet any field requirements.

The flange provided permits mounting of this control on any furnace hood, as it is adjustable for any angle between 30 and 90 degrees. Easily installed by means of the four sheet metal screws provided.

SPECIFICATIONS

TYPE M-51: Available in standard ranges 25 to 300°F., 50 to 500°F., or 50 to 650°F. Recommended as limit control on installations where minimum temperature codes are not in effect. Single pole—circuit opens on rise in temperature.

TYPE M-51D: Recommended where local code requirements or The National Board of Fire Prevention specifications are enforced. Range adjustable 25 to 200°F. Single pole—circuit opens on rise in temperature.

TYPE M-51G: Complies with A.G.A. ruling limiting operating temperatures of warm air furnaces. Range adjustable 25 to 250°F. Single pole—circuit opens on rise in temperature.

AIR CONDITIONING TYPES: Where an air conditioning installation must conform to National Board of Fire Underwriters' regulations (Rule 172 pamphlet 90) for the prevention of propogation of fire thru ducts passing thru fire walls, refer to Types M-51S and M-51R (page 23) which have been especially designed for this service.

TYPE M-52L: Two circuit low voltage—one circuit opens as other circuit closes. Recommended for use with 3 wire damper motors or other series "20" equipment. Capacity 4 amp.—25 volt. Standard range 50 to 500°F.

ELECTRICAL CAPACITY: Standard single pole instruments 10 amp.-115V., 5 amp.-230V. Not available for 440V.

MOTOR RATING: 1 H.P. Repulsion-Induction, ½ H.P. Split-Phase or D.C.

SPECIAL CIRCUITS: Available double pole or two circuit—see page 56 for ordering data and addition to list price.

TYPE NO	RANGE ADJ	CODE	LIST PRICE
M-51	25-300° F.	utoow	$7.00
M-51	50-500° F.	utopx	7.00
M-51	50-650° F.	uvker	7.00
M-51D	50-200° F.	utoqv	7.00
M-51G	25-250° F.	uvoip	7.00
M-52L	50-500° F.	utosz	8.00

With Centigrade graduations—
Code "utkn" No extra charge

Shipping weight approx 5 lbs.



TYPE 116 MERCOID DUCTATHERM

LOW VOLTAGE WARM AIR LIMIT CONTROL

Type 116 Mercoid Ductatherm is recommended as a limit control for warm air systems where the equipment controlled is of the low voltage type such as damper motors or gas valves.

The Ductatherm has an external dial calibrated from 50 to 300°F. To set the operating range it is merely necessary to move the external adjustment pointer to the required temperature.

The wiring is simplified as three terminals are provided as well as two low voltage cable bushings. Either series or multiple hook-ups can be made without splicing any connections.

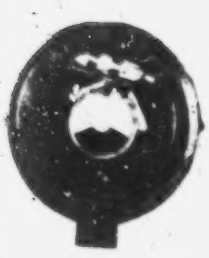
Furnished standard with 9 inch extension sleeve. Available on special order (no extra charge) with 4¼ inch sleeve length. Available only with flat mounting flange.

ELECTRICAL CAPACITY: Low Voltage—9/10th amp., 24 volt.

TYPE NO	RANGE ADJ	CODE	LIST PRICE
116	50-300° F	utozh	$ 7.00

For Centigrade graduations—
Code "utim" No extra charge

Shipping weight approx 3 lbs.



TYPE M-53

TYPE M-53SW MERCOID WARM AIR FAN CONTROL

FURNISHED STANDARD WITH SUMMER SWITCH

The Mercoid Warm Air Fan Control is neat in appearance and is sturdily constructed thruout to render long and dependable service in the field. Its use is recommended to control the operation of air-circulating or booster fans. This instrument operates the fan economically and prevents blowing cold air into the room if furnace is not hot enough to deliver heat.

All Type M-53SW Controls are furnished standard with lock type manual switch button. Turning button locks fan switch in "on" position and permits operation of fan during summer months for ventilating purposes. When furnace is again fired and temperature rises, manual switch automatically unlatches and restores control to normal operation.

The Mercoid switch is of the enclosed mercury contact type. It is not subject to open arcing, corrosion, oxidation, or pitting and will operate indefinitely without deterioration. The mechanism of this control has many outstanding features. The dial, located in the center of the instrument, slowly rotates as the temperature on the bi-metal coil increases or decreases. This dial is clearly calibrated in degrees Fahrenheit, and a pointer indicates the temperature in the furnace or duct,—enabling the installation or service men to check the fan operation.

A simple double adjustment is provided for setting both the "high" and "low" operating points. The range can be adjusted over the entire scale, and the differential can be set for very close operation, or may be widened to meet any field requirements.

The flange provided permits mounting of this control on any furnace hood, as it is adjustable for any angle between 30 and 90 degrees. Easily installed by means of the four sheet metal screws provided.

SPECIFICATIONS

TYPE M-53SW: Standard ranges 25 to 300°F., or 50 to 500°F. Circuit closes as temperature rises. Recommended for installations where minimum temperature codes are not in effect.

TYPE M-53SWD: Recommended where local code requirements or The National Board of Fire Prevention specifications are enforced. Range adjustable 25 to 175°F. Circuit closes as temperature rises.

TYPE M-53SWG: Complies with A.G.A. ruling limiting the operating temperatures of warm air fans. Range adjustable 25 to 200°F. Single pole—circuit closes on rise in temperature.

ELECTRICAL CAPACITY: Standard single pole instruments, 10 amp.-115V., 5 amp.-230V. either A.C. or D.C. Not available for 440V.

MOTOR RATING: 1-H.P. Repulsion-Induction, ½ H.P. Split Phase or D.C.

SPECIAL CIRCUITS: Available double pole or two circuit—see page 56 for ordering data and addition to list price.

M-53SW	25-300° F	utowe	$7.50
M-53SW	50-500° F	utoxf	7.50
M-53SWD	25-175° F	utoyg	7.50
M-53SWG	25-200° F	uvokq	7.50

With Centigrade graduations—
Code "utio" No extra charge

Shipping weight approx 5 lbs.

COMBINATION FAN AND LIMIT WARM AIR CONTROLS

EQUIPPED WITH THE MERCOID SEALED MERCURY CONTACT SWITCH



TYPE M-80



SIDE VIEW TYPE M-80 SHOWING ADJUSTABLE FLANGE



STRAIGHT NON-ADJUSTABLE MOUNTING FLANGE

TYPE M-80 COMBINATION FAN AND LIMIT CONTROL —WITH SUMMER SWITCH

Four Adjustments provided for Independently Setting the Cut-in and Cut-out Temperatures of Both the Fan and Limit Switches.

The Type M-80 Mercoid Warm Air control is a duplex instrument, combining within one case all of the well known field proved features of the Type M-51 Limit Control and the Type M-53 Fan Control. This instrument is recommended for air conditioning systems or other warm air applications employing forced circulation and automatic heating equipment. The limit switch opens its circuit on rising temperatures and protects the furnace against overheating. The fan switch, which closes its circuit on rising temperatures, regulates the operation of the fan and prevents blowing cold air into the rooms if the furnace is not hot enough to deliver heat.

The mechanism of this control has many outstanding features. A red dial, located in the center of the instrument, slowly rotates as the temperature changes on the bimetal coil. This dial is clearly calibrated in Fahrenheit degrees with a scale in duplicate—one scale for the limit switch settings, the other for the fan switch settings. A temperature indicating pointer is provided which indicates, on the graduated dial, the temperature in the furnace or duct. Serving the same purpose as a thermometer this temperature indicator enables installation or service men to check the proper size of fire when making necessary adjustments.

Four simple adjustments are provided for independently setting the cut-in and cut-out temperatures of both the fan and limit switches. The differentials can be set for very close operation or can be widened to meet any field requirement.

The Mercoid enclosed mercury contact switches are not subject to open arcing, corrosion, oxidation or pitting and operate indefinitely without deterioration.

This instrument is provided as standard with a special adjustable flange which permits mounting on any furnace hood, where the angle is from 30 to 90 degrees. Easily installed by means of four sheet metal screws provided. For air conditioning units with flat surfaces, can be furnished on special order with flat non-adjustable flange as illustrated at reduced cost when ordered in quantities—Prices on application.

ALL TYPES STANDARD WITH SUMMER SWITCH

All Combination Controls are furnished standard with lock type manual switch button. Turning button locks fan switch in "on" position and permits operation of fan during summer months for ventilating purposes. When furnace is again fired and temperature rises manual switch automatically unlatches and restores control to normal operation.

LINE VOLTAGE INSTRUMENTS

The following instruments are for general applications where the limit switch and fan switch are required to directly control motors at line voltage.

TYPE M-80—For general applications. Range adjustable from 50 to 300° F.

TYPE M-82—For general applications requiring very close differentials. This instrument is equipped with longer bi-metal operating coil for more sensitive operation. Range adjustable from 50 to 225° F.

TYPE M-84—Complies with Detroit ordinance limiting operating temperatures of warm air furnaces. Fan switch range 50 to 175°. Limit switch 50 to 200° F.

TYPE M-88—Complies with A.G.A. ruling limiting operating temperatures of warm air furnaces. Fan switch range 50 to 200°. Limit switch 50 to 250° F.

LINE VOLTAGE FAN SWITCH—LOW VOLTAGE LIMIT SWITCH

The following instruments are for applications where the fan is to be directly controlled at line voltage and where the limit switch is to control low voltage equipment such as gas valves, damper controls etc. As both line voltage and low voltage enter the same case a steel barrier with low voltage cable clamp is provided between the terminal posts in accordance with requirements of Underwriter's Laboratories, Inc.

TYPE M-80B—Same as Type M-80 except with barrier. **TYPE M-82B**—Same as Type M-82 except with barrier. **TYPE M-84B**—Same as Type M-84 except with barrier. **TYPE M-88B**—Same as Type M-88 except with barrier.

ELECTRICAL CAPACITY (Each Circuit): 10 amp.-115 Volt, 5 amp.-230 Volt, A.C. or D.C.

MOTOR RATING (Each Circuit): 1 H.P. Repulsion-Induction, ½ H.P. Split-Phase or D.C.

LINE VOLTAGE CONTROLS

TYPE NO	RANGE ADJ	CODE	LIST PRICE
M 80	50 to 300°	uvfuh	$11.00
M 82	50 to 225°	uvfvi	12.00
M 84	Fan 50 to 175° / Limit 50 to 200°	uvfyl	12.00
M 88	Fan 50 to 200° / Limit 50 to 250°	uvogm	12.00

LINE VOLTAGE—LOW VOLTAGE

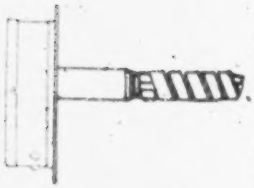
TYPE NO	RANGE ADJ	CODE	LIST PRICE
M 80B	50 to 300°	uvfzm	$11.00
M 82B	50 to 225°	uvgac	12.00
M 84B	Fan 50 to 175° / Limit 50 to 200°	uvgbd	12.00
M 88B	Fan 50 to 200° / Limit 50 to 250°	uvohn	12.00

Furnished standard with adjustable mounting flange. Can be furnished to manufacturers on special order with non-adjustable flat flange at reduced cost when ordered in quantities—Prices on application.

Shipping weight approx 6 lbs.



TYPE M-80F



SIDE VIEW TYPE M-80F

TYPE M-80F COMBINATION FAN AND LIMIT CONTROL

WITH FLANGED CASE—FOR DIRECT ATTACHMENT TO FURNACE JACKETS

Type M-80F Mercoid Combination Fan and Limit Controls incorporate the summer switch as well as all of the desirable adjustment features of the Type M-80 listed above. They are, however, supplied with flanged case for direct attachment to furnace jackets. Type M-80F controls are especially recommended for use in connection with furnace burner units which have a flat vertical surface. The appearance of the furnace is greatly improved by the flange mounting, and all wiring is concealed behind the furnace jacket.

STANDARD FINISH: Hard, rubber black enamel.

SPECIAL FINISHES: To manufacturers requiring quantities the Type M-80F can be furnished with special finish to match furnace jacket.....Prices on application.

STANDARD SLEEVE LENGTH: Standard stock instruments have an overall length, from the back of the instrument case to the end of the bimetal coil, as follows: Types M-80F and M-80BF—7 inches; Types M-84F and M-84BF—8 inches. Available to manufacturers in quantities with special sleeve lengths as desired.....Prices on application.

LINE VOLTAGE INSTRUMERTS

The following instruments are for general applications where the limit switch and fan switch are required to directly control motors at line voltage.

TYPE M-80F—For general applications. Range adjustable from 50 to 300°F.

TYPE M-84F—Complies with A.G.A. ruling as well as Detroit ordinance limiting the operating temperatures of warm air furnaces. Equipped with long sensitive bi-metal coil, but-stop pins are provided which limit Fan Switch adjustments to 175° F. and Limit Switch adjustments to 200° F.

LINE VOLTAGE FAN SWITCH—LOW VOLTAGE LIMIT SWITCH

The following instruments are for applications where the fan is to be directly controlled at line voltage and where the limit switch is to control low voltage equipment such as gas valves, damper controls etc. As both line voltage and low voltage enter the same case a steel barrier with low voltage cable clamp is provided between the terminal posts in accordance with requirements of Underwriter's Laboratories, Inc.

TYPE M-80BF—Same as Type M-80F except with barrier. Range 50 to 300°F.

TYPE M-84BF—Same as Type M-84F except with barrier. Fan switch range 50 to 175°. Limit switch 50 to 200°F.

ELECTRICAL CAPACITY AND MOTOR RATING same as Type M-80 shown above.

LINE VOLTAGE CONTROLS

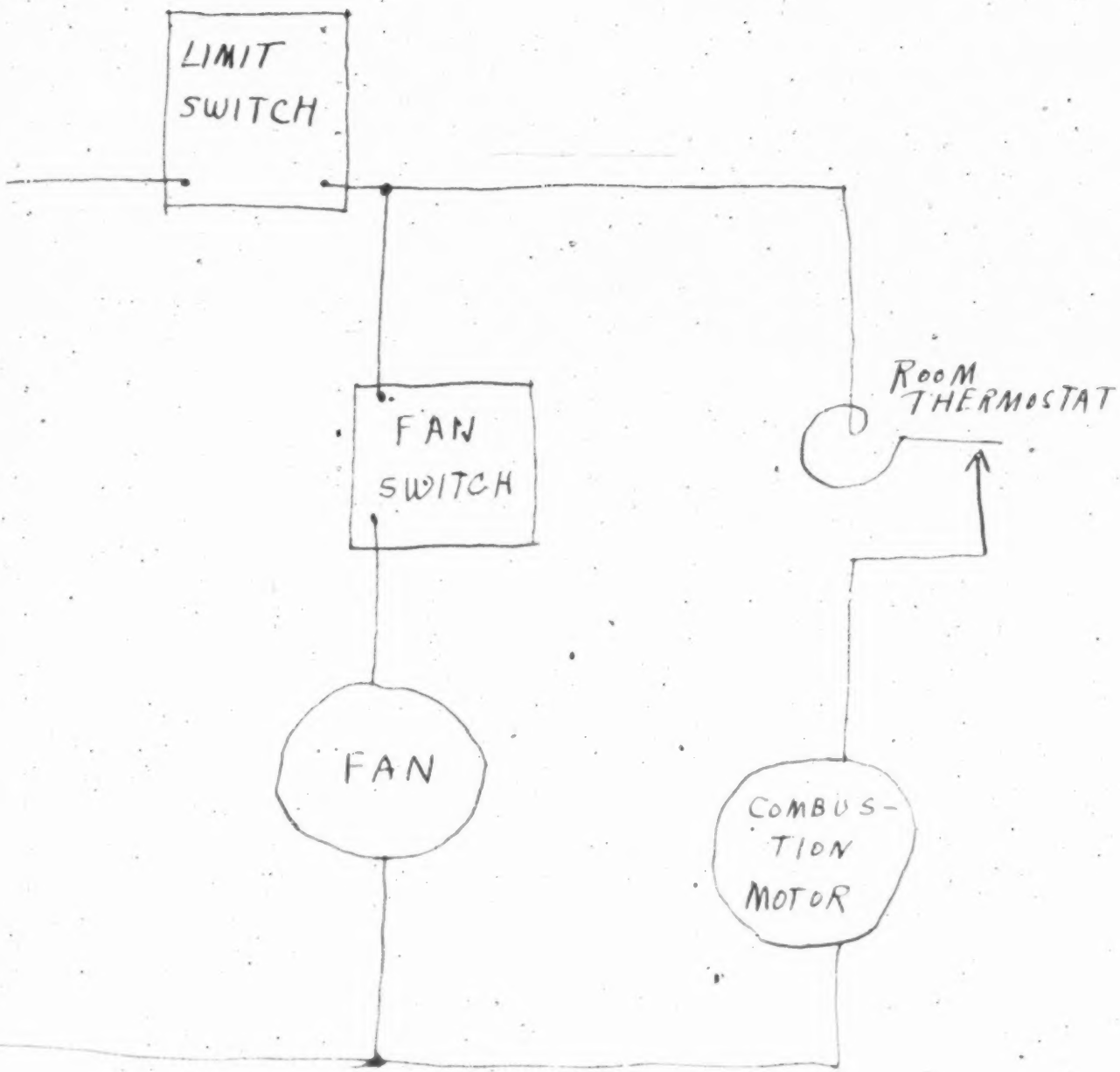
TYPE NO	RANGE ADJ	CODE	LIST PRICE
M 80F	50 to 300°	uvgce	$10.25
M 84F	Fan 50 to 175° / Limit 50 to 200°	uvgeg	11.25

LINE VOLTAGE—LOW VOLTAGE

TYPE NO	RANGE ADJ	CODE	LIST PRICE
M 80BF	50 to 300°	uvggi	$10.25
M 84BF	Fan 50 to 175° / Limit 50 to 200°	uvgiw	11.25

NOTE Special net prices quoted manufacturers requiring quantities.

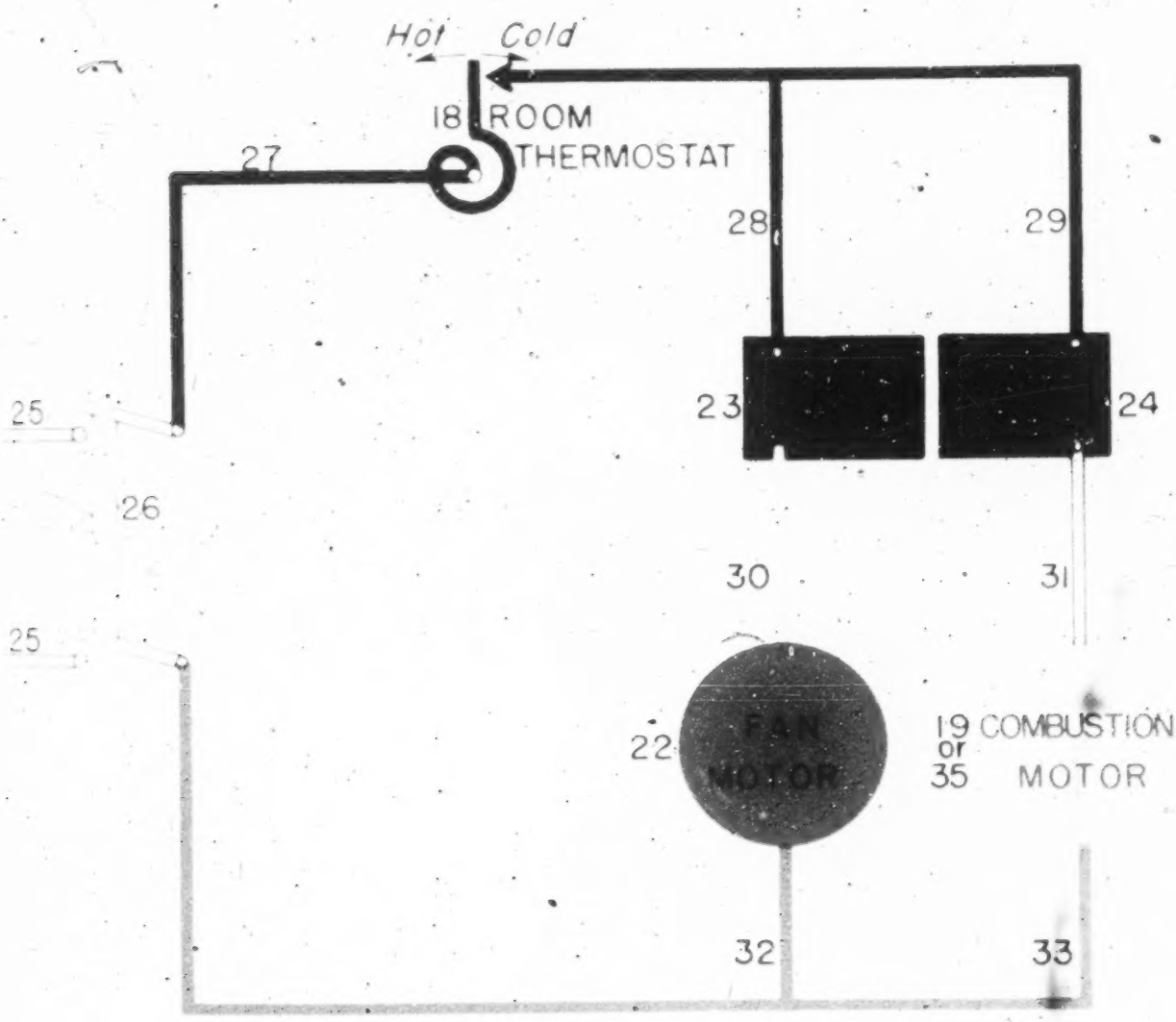
Shipping weight approx. 6 lbs.


LIMIT SWITCH
FAN SWITCH
ROOM THERMOSTAT
FAN
COMBUS-TION MOTOR

M-H Ex. 12

FREEMAN PATENT

OPERATION SEQUENCE DRAWING



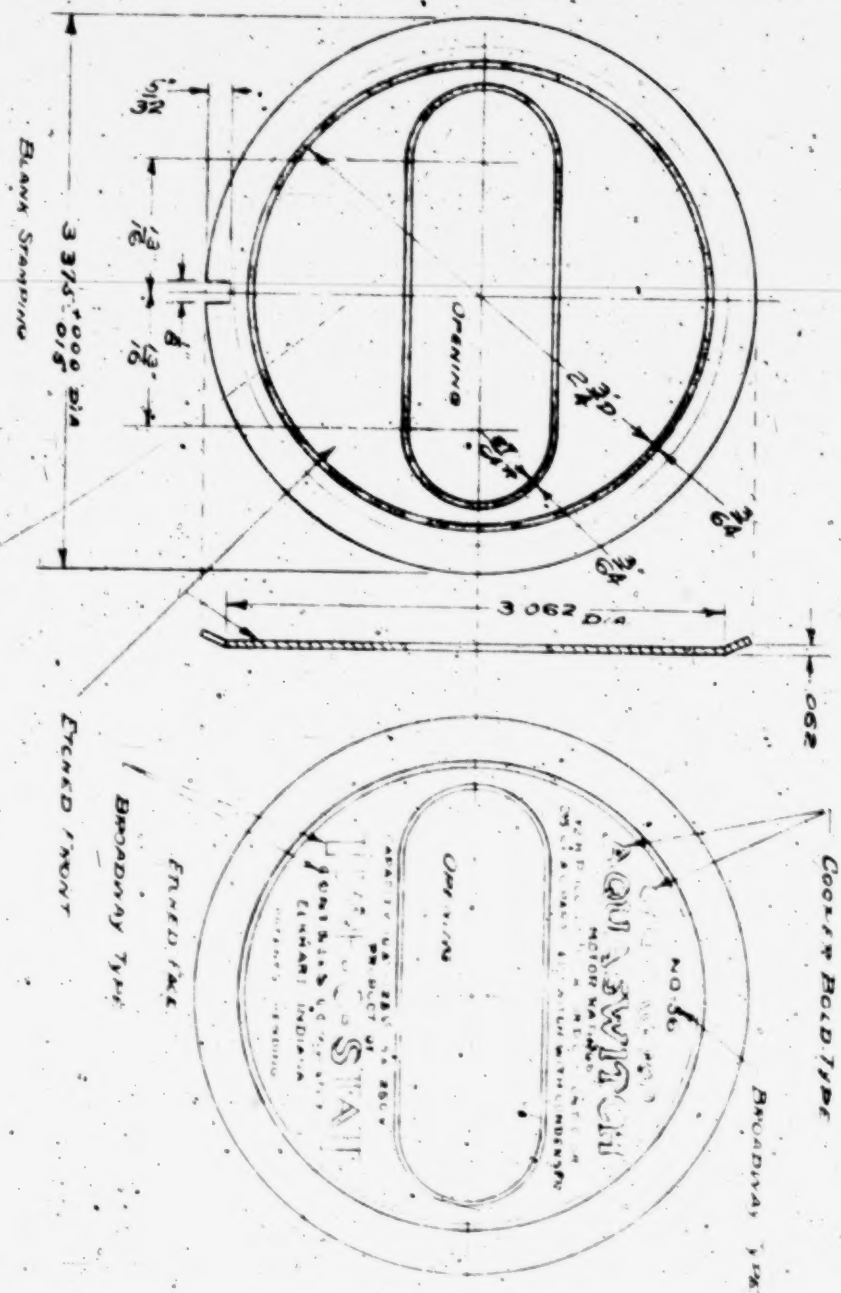
DRAWING ILLUSTRATING SEQUENCE OF OPERATION OF FREEMAN FURNACE CONTROL PERMITTING CHECKING OF COMBUSTION BY LIMIT SWITCH WHILE FAN CONTINUES TO OPERATE ON HIGH FURNACE TEMPERATURE

M-H EXHIBIT 13

CHANGE ISSUE	PURCHASE MATERIAL SPEC.	FINISH	ABSOLUTE CON-TAC-TOR CORP. ELKHART, IND., U.S.A.	N-350
1 — 4-23-29	SHEET ALUM	STOCK PER C —	NAME NAME PLATE	
STOCK SIZE	GAUGE	TEMPER	FEET PER C —	
THICKNESS .040"	WIDTH —	LENGTH —	LBS. PER C —	DR. CMC CHK. APPD. DATE 3-11-29
			SCALE 12" = 1 FT. SUPER N-223 DATE 9-2-27	

MANUFACTURING SPEC. DO NOT SCALE DRAWING
A TOLERANCE OF .005" IS ALLOWED ON FRACTIONAL DIMS AND .002" ON DEC. DIMS.
FINISH SEE NOTE UNLESS OTHERWISE SPECIFIED

LIST	REQ
56	1



NOTE
THIS WORD 'NUMBER' IS RED WITH ALUM OUTLINE
OTHER LETTERING AND BORDER RAISED POLISHED ALUM
WITH BLACK BACKGROUND LETTERING NOT SQUARED TO BE
IN CORRECT TYPE

N-341	N-906
WHEN MAKING CHANGES SEE	
N-350	

H. Exhibit 26

CHANGE ISSUE
3-9-28
CHGE MOTOR RATINGS
2-C 8-25-28
CHGE COND TO .85"
3 3-13-29
CHGE ABSOLUTE CONTACTOR CORP

PURCHASE MATERIAL SPEC
ETCHED BRASS

SEE NOTE

STOCK SIZE | GAUGE | TEMP. | STOCK PC 100 | TEST NO.

THICKNESS .025" | WIDTH | LENGTH | LES TEST

ABSOLUTE CONTACTOR CORP.
ELKHART, IND. U.S.A.

N-223

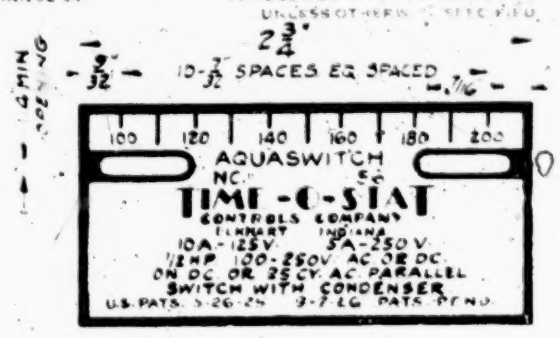
NAME PLATE

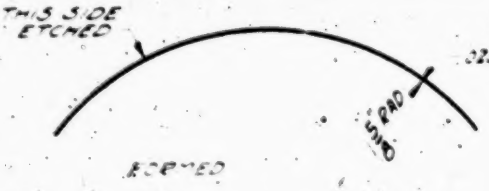
DR GB | CHK | APD | DATE 9-2-27
SCALE 2 | N-496 | 9-15-26

A TOLERANCE OF — IS ALLOWED ON FINAL DIM AND — UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

56 /





ALL ETCHED SURFACES TO BE SMOOTH AND FREE FROM BURRS
"TIME-O-STAT, CONTROLS COMPANY" TO BE BROADWAY TYPE, ALL OTHER LETTERS TO BE GOTHIC

56 /

C 300

N-223

WHEN MAKING CHANGES SEE N 224

M-H. Exhibit 28

CHANGE ISSUE
LOATS-11-19-31
3/4 WAS 1/2
1/4 WAS 1/16

PURCHASE MATERIAL SPEC | FINISH

STOCK SIZE	GAUGE	NUMBER
THICKNESS	WIDTH	LENGTH

ETCH PER C 100
FEET PER C
LBS. PER C

TIME-O-STAT CONTROLS CO.
ELKHART, IND., U.S.A.

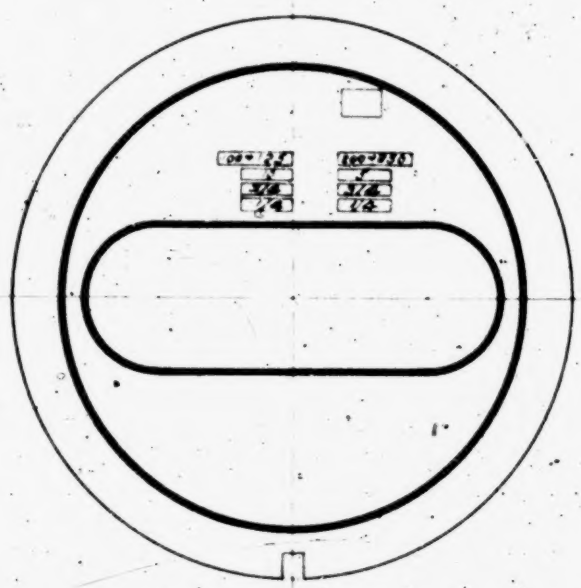
N-350

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PEASE, CHICAGO

M-H. Exhibit 29

(M-H Ex. 30)

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APR 1 [illegible] 1939

ESTABLISHED 1885

AUTOMATIC CONTROLS MH

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

M-H AUTOMATIC CONTROL SYSTEMS · BROWN INDUSTRIAL INSTRUMENTS · NATIONAL PNEUMATIC CONTROLS

MINNEAPOLIS, MINN.

April 18, 1939.

Perfex Corporation,
415 West Oklahoma Place,
Milwaukee, Wisconsin.

Gentlemen:

In connection with our license agreement to you under the Freeman Patent No. 1,813,732, we agree that so long as you do not sell separate heating medium temperature responsive controls for carrying out the system of the Freeman patent at a combined price which is less than 25% higher than the prices set forth in the Price Schedule of the agreement for any specific "Combination Furnace Control" comparable to carrying out in operation and function what the separate controls would do, we will not assert our rights against you or your customers under the Freeman Patent on account of such sales.

Yours very truly,

W. L. Huff - Vice President & Treasurer.

WLF:med

M-H Exhibit 31

M-H Exhibit 31

September 8, 1940

Minneapolis-Honeywell Regulator Company
Minneapolis
Minnesota

Re: Freeman License under
Patent 1,913,738

Attention: Mr. George H. Fisher, Attorney

Dear George:

We have just noticed that in the letter from you dated August 20, 1940, which was signed by Mr. W. L. Huff, there is a difference from the same letter dated April 18, 1939, which difference apparently resulted from a typographical error. In the letter dated April 18, 1939 - you will note that the phrase twenty-five cents was written as "25¢" - whereas in the letter dated August 20, 1940 this is written as "25%" (twenty-five percent).

Will you please verify this?

Very truly yours
PERPEX CORPORATION

VRTate/bls

Secretary

M-H Exhibit 31

ESTABLISHED 1885

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

M-H AUTOMATIC CONTROL SYSTEMS · BROWN INDUSTRIAL INSTRUMENTS · M-H (NATIONAL) PNEUMATIC CONTROLS

MINNEAPOLIS, MINN.

August 20, 1940

Perfex Corporation,
415 W. Oklahoma Place,
Milwaukee, Wisconsin.

Gentlemen:

In connection with our license agreement to you under the Freeman Patent No. 1,813,732, we agree that so long as you do not sell separate heating medium temperature responsive controls for carrying out the system of the Freeman patent at a combined price which is less than 25¢ higher than the prices set forth in the Price Schedule of the agreement for any specific "Combination Furnace Control" comparable to carrying out in operation and function what the separate controls would do, we will not assert our rights against you or your customers under the Freeman Patent on account of such sales.

Yours very truly,

W. L. Huff - Vice President

WLF:med

M-H Exhibit 31

ESTABLISHED 1885

AUTOMATIC CONTROLS MH MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

M-H AUTOMATIC CONTROL SYSTEMS · BROWN INDUSTRIAL INSTRUMENTS · M-H (NATIONAL) PNEUMATIC CONTROLS

PATENT DEPARTMENT
G. H. FISHER, ATTORNEY

September 6, 1940

Perfex Corporation
415 W. Oklahoma Place
Milwaukee, Wisconsin

Attention: W. R. Tate, Secretary

Dear Bob:

Thanks very much for your letter of September 5, 1940. I am glad that you noticed this typographical error.

I am attaching hereto the original and one extra copy of a new letter dated August 20th to replace the incorrect one sent you heretofore. Will you please return the incorrect letter.

Yours very truly,

George H Fisher

GHF:VS
Enclos.

George H. Fisher, Attorney

RECEIVED
SEP 9 - 1940
PAT. DEPT.

RECEIVED SEP 9 1940

1509 And afterwards, to wit, on the 27th day of February, A. D. 1942, being one of the days of the regular February term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable John P. Barnes, District, Judge, appears the following entry, to wit:

Entered Feb. 27, 1942

1510 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

MEMORANDUM.

On June 29, 1940, The Mercoid Corporation, a corporation of Delaware, having a principal place of business and factory in the city of Chicago, Illinois, (hereinafter referred to as "Mercoid"), filed its complaint for a declaratory decree against Minneapolis-Honeywell Regulator Company, a corporation of Delaware, licensed to do business in the state of Illinois (hereinafter referred to as "Minneapolis-Honeywell"). Subsequently, Mercoid filed its supplemental complaint against Minneapolis-Honeywell. By its complaint and supplemental complaint, Mercoid sought a decree adjudging that its devices, known as fan and limit controls, do not infringe or contribute to the infringement of Minneapolis-Honeywell's Freeman Patent No. 1,813,732, adjudging that said patent is invalid, and adjudging that Minneapolis-Honeywell has granted licenses to others to set up a monopoly beyond the scope of said patent, in restraint of trade and in violation of the anti-trust laws of the United States.

By its answer, Minneapolis-Honeywell alleged that the Mercoid fan and limits control is so constructed and arranged as to carry out the teachings and invention of Freeman Patent No. 1,813,732, that said device infringes said patent, and that said patent is valid, and it admits that it has granted licenses under said patent to certain named licensees, but it denies that it has granted licenses which broaden or tend to broaden the scope of said patent.

1511 On July 1, 1940, Minneapolis-Honeywell filed a complaint against Mercoid, wherein it charged infringement by Mercoid of said Freeman Patent No. 1,813,732. Mercoid answered, and by its answer denied infringement, denied validity of the patent, alleged that Minneapolis-Honeywell has been guilty of laches and is utilizing said

patent to establish a monopoly in the sale of a combination furnace control *per se* not coming within the boundaries of the Freeman patent.

The cases were consolidated and tried together.

Freeman Patent No. 1,813,732 was issued July 7, 1931, on an application filed January 16, 1931. In this patent, it is said:

"This invention relates to control apparatus, principally for use with a hot air furnace.

"The principal object of the invention is to provide a control for the rate of combustion and for the operation of an accelerating device, such as a fan, blower or similar apparatus, used for accelerating the rate of supply of the heat-conducting medium, such as air, to be heated by the furnace, said control being such as to permit the operation of said accelerating device and to check combustion in case the furnace becomes overheated and such as to interrupt the operation of said accelerating device while increasing the rate of combustion if the furnace has not been heated above a predetermined temperature.

"In addition, a control feature is added by means of which both the combustion and the supply of the heat-conducting medium are checked when the temperature of the room or object to be heated is above a predetermined degree."

As applied to a hot air furnace fired by a coal stoker, the system disclosed by the patent includes three thermostats, one in the room or space to be heated operated by changes in the temperature in said room or space and two in the hood of the furnace operated by changes in the temperature of the air in said hood. One of these last mentioned thermostats opens and closes a circuit passing through the motor which drives the coal stoker, and the other thermostat in the hood opens and closes the circuit which passes through the motor which drives a fan in the cold air supply to the furnace.

The patent contains ten claims. Claims 1, 2, 3, 6, 7, and 8 omit reference to the room thermostat. Claims 4, 5, 9 and 10 include references to three thermostats. Minneapolis-Honeywell relies upon Claims 1, 4, 6 and 9. They are as follows:

1512 1. In a furnace control, the combination of apparatus for controlling the rate of combustion and the rate of supply of a heat-conducting medium, thermostatic apparatus responsive to furnace temperature, and connec-

tions between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to check combustion while supplying said medium when furnace temperature exceeds a predetermined degree.

4. In a furnace control, the combination of apparatus for controlling the rate of combustion and the rate of supply of a heat-conducting medium, thermostatic apparatus responsive to furnace temperature, connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to check combustion while supplying said medium when furnace temperature exceeds a predetermined degree, other thermostatic apparatus responsive to the temperature of the object to be heated, and connections between said control apparatus and said last-mentioned thermostatic apparatus by means of which said control apparatus operates to check both combustion and the supply of said medium when said object is above a predetermined temperature irrespective of the furnace temperature.

6. In a furnace control, the combination of an electrically-operated combustion control apparatus adapted to accelerate combustion when supplied with electric power and to check combustion when not so supplied, a motor-driven fan for controlling the supply of air to be heated, a source of electric power, electric circuits for connecting said power source to said control apparatus and the motor of said fan, and thermostatic apparatus interposed in said circuits, responsive to furnace temperature and adapted to interrupt the circuit to said combustion control apparatus while completing the circuit to the motor of said fan when furnace temperature is above a predetermined degree.

9. In a furnace control, the combination of an electrically-operated combustion control apparatus adapted to accelerate combustion when supplied with electric power and to check combustion when not so supplied, a motor-driven fan for controlling the supply of air to be heated, a source of electric power, electric circuits for connecting said power source to said control apparatus and the motor of said fan, thermostatic apparatus interposed in said circuits, responsive to furnace temperature and adapted to interrupt the circuit to said combustion control apparatus while completing the circuit to the motor of said fan when furnace temperature is above a predetermined degree, and other thermostatic apparatus interposed in said circuits in series

connection with said first-mentioned thermostatic apparatus, responsive to the temperature of the space to be heated and adapted to interrupt the circuits to both said combustion control apparatus and to the motor of said fan when said last mentioned temperature is above a predetermined value.

1513 As against the validity of the Freeman patent, Mercoid cites Teal Patent No. 1,067,627. The Teal patent discloses no fan or thermostat in the furnace hood controlling a fan. In this respect it is like Johnson Patent No. 1,602,363, Mercoid Bulletin D of April 1, 1924, Mercoid Catalog H-3 of 1928, page 28, and Oil-O-Matic Drawing A-150 of December 24, 1925, which were also cited by Mercoid. Mercoid also cited Wiring Diagram No. 740, on page 31 of its catalog No. G-5 of 1929 revised edition. This disclosed the same sort of a control as Teal. Mercoid also cited Edgecombe Reissue Patent No. 15,531. Edgecombe differs from Freeman in that it has two room thermostats instead of a one room thermostat, and has no limit switch in the furnace hood. Mercoid also cited Cross Patent No. 1,758,146. Cross differs from Freeman in that it has neither a fan thermostat nor a limit thermostat in the furnace hood. Mercoid also cited Illustration No. 4 in its Bulletin A-5 of June, 1930. Illustration No. 4 merely discloses a portion of the disclosure of the Edgecombe Patent. Specifically, there is no disclosure of a limit switch or a combustion motor. Mercoid also cited Mercoid Drawing No. 266 of September 27, 1927. This disclosure differs from that of Freeman in that in Drawing No. 266 the limit switch is cut into the circuit ahead of the room thermostat, which, of course, makes an entirely different sequence of operation. Mercoid also cited Drawing No. 748 in its Catalog No. H-5 of 1929, Revised Edition. Drawing No. 748 also sets the limit switch ahead of the room thermostat, thereby making a sequence of operation entirely different from that of Freeman. Neither Mercoid Drawing No. 266 of September 27, 1927, nor Drawing No. 748 of Mercoid Catalog No. H-5 of 1929 shows a limit switch between the room thermostat and the combustion motor, as does Freeman.

1514 Mercoid also set up several prior uses—that of Portner at Wheaton, Illinois, and those of the Evangelical Church and Ned Dolan at Bloomington, Illinois. It is clear that Portner is now using a system of furnace control which closely approaches that of the patent in suit,

though it is a fact that it differs in one particular. The Court is not satisfied, however, that it was installed as it now exists prior to the Freeman date of application. The same thing is true of the Evangelical Church and Ned Dolan prior uses. They differ somewhat from Freeman disclosure in at least one particular, but their great defect is that the court is not satisfied that they were installed in their present condition prior to the Freeman critical date.

The court is of the opinion that the Freeman patent discloses invention over the prior art and that it is valid.

Referring to the defense of laches, the court is of the opinion that there are no elements of estoppel involved and that the mere delay which has taken place does not contribute a defense.

On the charge that Minneapolis-Honeywell has been using its patent on the Freeman system of furnace control as a means of creating or attempting to create a monopoly on an unpatented device, contrary to the rule laid down in the Morton Salt Case and those somewhat similar cases which preceded but perhaps do not go quite as far as the Morton Salt Case, the court is of the opinion that it must be held that Minneapolis-Honeywell has been so using its patent as to tend to create a monopoly in an unpatented device. Minneapolis-Honeywell has been licensing others and has offered to license Mercoid to manufacture, use and sell a single device which embodies within itself two elements of the Freeman patent, namely, the two thermostats which are placed in the furnace hood, one being the
1515 fan switch and the other being the limit switch. This device, embodying these two elements, is said to be a patented device, but the patent is owned by some person other than Minneapolis-Honeywell and Mercoid, so as to them and so far as this case is concerned it is an unpatented device. The Freeman patent is not a patent on either the fan switch or the limit switch or both of them. It is a patent on a system of furnace control, which requires three thermostats for its operation. It happens that two of those thermostats are a fan switch and a limit switch.

The court is of the opinion that it follows, from what has been said, that both complaints, that of Mercoid and that of Minneapolis-Honeywell, must be dismissed for want of equity.

The court is of the opinion that it will be equitable to divide the costs, and that shall be done.

Counsel for each side may prepare and, within 7 days from this date, present drafts of findings of fact, conclusions of law, and a decree not inconsistent with the views hereinabove expressed. Counsel may, within 14 days from this date, present, in writing, such, if any, observations in respect of or exceptions to the drafts presented on behalf of the other side as he may deem necessary or desirable. This having been done, the matter of making findings of fact, conclusions of law, and a decree will be taken by the court without further oral argument.

Counsel may take and keep, subject to the order of the court, the exhibits of their respective clients.

Barnes,
Judge.

February 27, 1942.

1516 And afterwards, to wit, on the 24th day of March, A. D. 1942, being one of the days of the regular March term of said Court, in the record of proceedings thereof, in said entitled cause, before Honorable John P. Barnes, District Judge, appears the following entry, to wit:

Filed March 24, 1942

1517 IN THE DISTRICT COURT OF THE UNITED STATES,

For the Northern District of Illinois,

Eastern Division.

The Mercoid Corporation, *Plaintiff*, *vs.* Minneapolis-Honeywell Regulator Company, *Defendant.*	Civil Action No. 1839.
	Consolidated Case No. 1839.
Minneapolis-Honeywell Regulator Company, *Plaintiff*, *vs.* The Mercoid Corporation, *Defendant.*	Civil Action No. 1842.

FINDINGS OF FACT AND CONCLUSIONS OF LAW.

This Cause having been heard in open court, where all the parties were represented by counsel, presented evidence, and made argument, the Court makes the following Findings of Fact and Conclusions of Law:

Findings of Fact.

1. The Mercoid Corporation, (hereinafter called "Mercoid"), is a corporation organized under the Laws of the State of Delaware, having a principal place of business and factory in the City of Chicago, Illinois,

1518 2. Minneapolis-Honeywell Regulator Company (hereinafter called "Minneapolis-Honeywell"), is a corporation organized under the Laws of the State of Delaware, and is licensed to do business in the State of Illinois.

3. Minneapolis-Honeywell is the sole owner of United

States Letters Patent No. 1,813,732, issued July 7, 1931, to Edward E. Freeman, on an application filed January 16, 1931, entitled "Furnace Control."

4. On June 29, 1940, Mercoid filed its complaint for a declaratory decree against Minneapolis-Honeywell, and later filed a supplemental complaint. Mercoid, by its complaint and supplemental complaint, asks for a decree holding that its devices, known as fan and limit controls, do not infringe or contribute to the infringement of said Freeman patent No. 1,813,732, and that said patent is invalid, and Minneapolis-Honeywell, in granting licenses to others, has set up a monopoly beyond the scope of said patent, in violation of the anti-trust laws of the United States.

5. On July 1, 1940, Minneapolis-Honeywell filed a complaint against Mercoid charging infringement and contributory infringement by Mercoid of said Freeman patent No. 1,813,732. Mercoid, in its answer, denied infringement and contributory infringement, denied validity of the patent, and alleged that Minneapolis-Honeywell was guilty of laches.

1519 6. The suit brought by Mercoid and the suit brought by Minneapolis-Honeywell were consolidated and tried together.

7. The accused Mercoid device is exemplified by Mercoid's Physical Exhibit PPP, which device is known as Type M-80.

8. Mercoid's wiring diagrams for installation of the accused Mercoid device as a furnace control, are illustrated in Mercoid's bulletin M-12, Mercoid's Exhibit CC, and installation of the accused device in accordance with said wiring diagrams results in the sequence of operation of the Freeman invention.

9. Minneapolis-Honeywell relies for infringement and contributory infringement upon claims 1, 4, 6 and 9 of said Freeman patent No. 1,813,732 (Civil Action No. 1842).

10. The control apparatus disclosed in the Freeman patent is directed to a hot air furnace and includes three thermostats, one in the room or space to be heated, operated by changes in temperature in the room or space to be heated, and, two in the hood of the furnace operated by changes in the temperature of the air in the hood of the furnace. Of the two thermostats in the hood of the furnace, one opens and closes a circuit to the combustion motor and the other thermostat opens and closes a circuit through a motor for driving a fan located in the cold air

supply of the furnace for delivering the heating medium from the furnace to the room or space to be heated.

11. As to the claims relied on by Minneapolis-Honeywell, claims 1 and 6 do not specify a room thermostat, whereas claims 4 and 9 do include a room thermostat.

1520 12. As to the ten claims in the patent, claims 1, 2, 3, 6, 7 and 8 do not specify a room thermostat, whereas claims 4, 5, 9 and 10 do include a room thermostat.

13. The prior art, prior invention and prior public uses relied upon by Mercoid as against the validity of the Freeman patent No. 1,813,732, are as follows:

Patents

Teal	No. 1,067,627	Johnson	1,602,363
Edgecombe	No. Re. 15,531	Cross	1,758,146

Publications and Wiring Diagrams

Mercoid Bulletin D, April 1, 1924.
Mercoid Catalog H-3, of 1928, page 28.
Oil-O-Matic drawing A-150, of Dec. 24, 1925.
Mercoid wiring diagram 740, page 31, of Mercoid Catalog H-5, 1929.
Illustration No. 4, Mercoid Bulletin A-5 of June, 1930.
Mercoid drawing 266, dated Sept. 27, 1927.
Mercoid drawing 748 of Catalog H-5 of 1929.

Prior Uses.

J. A. Portner, place of business, Wheaton, Illinois,
Evangelical Church, Bloomington, Illinois, and
Ned Dolan residence, Bloomington, Illinois.

14. The Court finds that the Teal patent discloses no fan for delivering the heating medium from the furnace to the room or space to be heated and no thermostat in the furnace hood for controlling a fan.

Johnson patent 1,602,363; Mercoid's Bulletin D, dated April 1, 1924; Mercoid's Catalog H-3 of 1928, page 28; Oil-O-Matic drawing No. A-150 dated December 24, 1925, and wiring diagram No. 740 on page 31 of Mercoid Catalog H-5 dated 1929, all follow the Teal patent and lack the disclosure of a fan and a thermostat in the furnace hood for controlling a fan.

1521 15. The Court finds that Edgecombe Reissue Patent No. 15,531 discloses two room thermostats instead

of one, as found in Freeman, and it has no limit switch or thermostat in the furnace hood for opening the circuit passing through the motor which drives the burner upon temperature rise in the furnace hood beyond a safe limit.

Mercoid's illustration No. 4 of Bulletin A-5 dated June 1930 discloses only a portion of the Edgecombe patent and differs from Freeman in that there is no disclosure of a limit switch or a combustion motor.

16. The Court finds that the Cross patent No. 1,758,146 differs from Freeman in that it has neither a fan thermostat nor a limit thermostat in the furnace hood.

17. The Court finds that Mercoid's drawing 266 dated September 27, 1927, differs from Freeman in that the limit switch is cut into the circuit ahead of the room thermostat and this brings about an entirely different sequence of operation.

Drawing No. 748 of Mercoid catalog No. H-5 of 1929 also places the limit switch ahead of the room thermostat, making an entirely different sequence of operation from that of Freeman.

Neither Mercoid drawing No. 266 of September 27, 1927, nor drawing 748 of Mercoid catalog H-5 of 1929 shows a limit switch between the room thermostat and combustion motor, as does Freeman.

1522 18. The Court finds that the several prior uses set up by Mercoid as follows—

J. A. Portner establishment, Wheaton, Illinois,
Evangelical Church, Bloomington, Illinois, and
Ned Dolan residence, Bloomington, Illinois,

closely approach the furnace control of the Freeman patent, although they differ in one particular, have not been proven to the satisfaction of the Court and that these installations relied upon as prior uses were not installed either in the J. A. Portner establishment, or in the Evangelical Church, or in the Ned Dolan residence, in their present condition, prior to the Freeman filing date of January 16, 1931.

19. The Court finds that the Freeman patent discloses invention over the prior patented art, publications and drawings relied upon by Mercoid, and that the patent is valid. (Civil Action No. 1839.)

20. The Court further finds that claims 1, 4, 6 and 9, relied upon by Minneapolis-Honeywell, disclose invention and are valid. (Civil Action No. 1842.)

21. The defense of Mercoid of laches by Minneapolis-Honeywell has not been established since there are no elements of estoppel involved and mere delay does not constitute a defense.

22. The Court finds that when the M-80 is connected as recommended by Mercoid in its illustration No. 8, which forms a part of its installation instructions sent along with each of the M-80 controls, The Mercoid Corporation is a contributory infringer of Claims 1, 4, 6 and 9 of the Freeman patent.

23. The Court finds that Mercoid's Catalog, Ex. CC, contains a wiring diagram substantially like Illustration No. 8.

1523 24. The Court finds that when the M-80 is connected as recommended by Mercoid in its Illustration No. 7, which forms a part of its installation instructions sent along with each of the M-80 controls, The Mercoid Corporation is a contributory infringer of claims 1 and 6 of the Freeman patent.

25. The Court finds that wiring diagrams No. 2403 contained in Mercoid's Bulletin M-H Ex. 10, and another of the wiring diagrams illustrated in Mercoid's Ex. CC, and wiring diagrams 2407, 2408, 2409 and 2410 contained in Mercoid's Booklet M-H, Ex. 11, are all substantially the same as Illustration No. 7 in so far as the use of the M-80 in such wiring diagrams is concerned.

26. Minneapolis-Honeywell has been licensing others and has offered to license Mercoid to manufacture, use and sell a single device which embodies within itself two elements of the Freeman patent, namely, the two thermostats which are placed in the furnace hood, one being the fan switch and the other being the limit switch. This device, embodying these two elements, is said to be a patented device, but the patent is owned by some person other than Minneapolis-Honeywell and Mercoid, so that as to them and so far as this case is concerned, it is an unpatented device.

27. The Freeman patent is not a patent on either the fan switch or the limit switch or both of them. It is a patent on a system of furnace control, which requires three thermostats for its operation.

28. The Court finds that Minneapolis-Honeywell has used its Freeman patent so as to tend to create a monopoly in an unpatented device.

1524 Conclusions of Law.

1. The Court has jurisdiction of the subject-matter and of the parties.

2. Title to the Freeman patent No. 1,813,732 is in Minneapolis-Honeywell.

3. The Freeman patent discloses invention over the prior art, and is valid. (Civil Action No. 1839.)

4. Claims 1, 4, 6 and 9 of the Freeman patent No. 1,813,732 relied upon by Minneapolis-Honeywell, are valid. (Civil Action No. 1842.)

5. The delay in bringing the suit by Minneapolis-Honeywell against Mercoid does not constitute laches.

6. Minneapolis-Honeywell has used its patent to tend to create a monopoly in an unpatented device.

7. The complaint of Mercoid and the complaint of Minneapolis-Honeywell should be dismissed for want of equity.

Barnes,
United States District Judge.

Chicago, Illinois,
March 24, 1942.

1525 And afterwards, to wit, on the 24th day of March, A. D. 1942, being one of the days of the regular term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable John P. Barnes, District Judge, appears the following entry, to wit:

Filed March 24, 1942

1526 FINAL DECREE.

This Cause coming on for hearing and trial having been had in open court, the parties having been represented by counsel and having presented evidence and made arguments, and Findings of Fact and Conclusions of Law having been entered, it is Adjudged and Decreed, that:

1. Minneapolis-Honeywell Regulator Company is the owner of United States Letters Patent No. 1,813,732, issued July 7, 1931, to Edward E. Freeman, for Furnace Control.

2. Patent No. 1,813,732, to Freeman discloses invention and is valid (Civil Action No. 1839), and particularly as to claims 1, 4, 6 and 9 relied upon by Minneapolis-Honeywell (Civil Action No. 1842).

3. The Mercoid Corporation is a contributory infringer of claims 1, 4, 6 and 9 of the Freeman patent.

1527 4. Minneapolis-Honeywell has been so using its Freeman patent as to tend to create a monopoly in an unpatented device.

5. Each of the complaints herein is hereby dismissed for want of equity.

6. Each of the parties pay one-half of the taxable costs.

Enter:

Barnes,
United States District Judge.

Chicago, Illinois,
March 24, 1942.

1528 And on, to wit, the 25th day of March, A. D. 1942, came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Notice of Appeal in words and figures following, to wit:

Filed March 25, 1942

1529 IN THE UNITED STATES DISTRICT COURT.

* * (Caption—1839) * *

NOTICE OF APPEAL.

Notice is hereby given that Minneapolis-Honeywell Regulator Company, defendant in Consolidated Case No. 1839, (Case No. 1839 being the number under which The Mercoid Corporation v. Minneapolis-Honeywell Regulator Company, No. 1839, was consolidated with Minneapolis-Honeywell Regulator Company v. The Mercoid Corporation, No. 1842), hereby appeals to the Circuit Court of Appeals for the Seventh Circuit from that part of the final judgment (decree) entered herein on the 24th day of March, 1942, dismissing its complaint in No. 1842 and adjudging that it has been so using its Freeman patent as to tend to create a monopoly in an unpatented device.

Bair & Freeman,
Attorneys for Appellant,
Minneapolis-Honeywell Regulator Company.

W. P. Bair,
Will Freeman,
George Fisher,
Of Counsel.

Dated:
Chicago, Illinois,
Mar. 25, 1942.

Filed March 26, 1942

1530 And on, to wit, the 26th day of March, A. D. 1942, came the defendant by its attorneys and filed in the Clerk's office of said Court its certain Statement of Points in words and figures following, to wit:

1531 IN THE UNITED STATES DISTRICT COURT.

* * (Caption—1839) * *

STATEMENT OF POINTS ON WHICH DEFENDANT WILL RELY ON APPEAL.

Minneapolis-Honeywell Regulator Company, defendant-appellant, (plaintiff in No. 1842 below), states that the following are the points upon which it relies in this appeal:

1. The Court erred in finding that Minneapolis-Honeywell Regulator Company has been so using its Freeman patent No. 1,813,732, as to tend to create a monopoly in an unpatented device.

2. The Court erred in not finding that the conduct of the Minneapolis-Honeywell Regulator Company, including its licensing practice, involved a fair exercise of its rights under the patent laws.

3. The Court erred in dismissing the Complaint of Minneapolis-Honeywell Regulator Company for want of equity.

1532 4. The Court erred in not ordering The Mercoid Corporation enjoined from further contributory infringement of said Freeman patent,

5. The Court erred in not ordering an accounting by The Mercoid Corporation for damages and profits on account of its contributory infringement.

Bair & Freeman,
Attorneys for Minneapolis-Honeywell Regulator Company.

W. P. Bair,
Will Freeman,
George Fisher.
Dated:
Chicago, Illinois,
March 26, 1942.

1533 And on, to wit, the 25th day of March, A. D. 1942, came the Defendant by its attorneys and filed in the Clark's office of said Court its certain Bond on Appeal in words and figures following, to wit:

Filed March 25, 1942

1534 BOND ON APPEAL.

Know All Men by These Presents:

That we, Minneapolis-Honeywell Regulator Company, as principal, and Globe Indemnity Company, of New York, as sureties, are held and firmly bound unto The Mercoid Corporation, in the full and just sum of Two Hundred and Fifty Dollars ($250.00), to be paid to the said The Mercoid Corporation, or its attorneys, executors, administrators or assigns; to which payment, well and truly to be made, we bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents. Sealed with our seals and dated this 25th day of March, 1942.

Whereas, lately at a session of the District Court of the United States for the Northern District of Illinois, in a suit pending between The Mercoid Corporation, Plaintiff, and Minneapolis-Honeywell Regulator Company, Defendant, Consolidated Case No. 1839, a decree as rendered against the said Minneapolis-Honeywell Regulator Company, and the said Minneapolis-Honeywell Regulator Company having filed its Notice of Appeal to the United States Circuit Court of Appeals for the Seventh Circuit in the Clerk's Office of the said District Court to reverse the decree of the aforesaid suit in the United States Circuit Court of Appeals for the Seventh Circuit, to be holden at Chicago within forty days from the date hereof.

Now, the condition of the above obligation is such, that if the said Minneapolis-Honeywell Regulator Com-
1535 pany shall prosecute its appeal to effect, and shall answer all costs that may be awarded against it if it fail to make its plea good, then the above obligation to be void; otherwise to remain in full force and virtue.

Minneapolis-Honeywell Regulator Company,
By Bair & Freeman,
Its Attorneys.

W. P. Bair,
Will Freeman,
George H. Fisher,
Of Counsel.

Globe Indemnity Company,
By (s) L. W. Zuttermeister,
L. W. Zuttermeister, Attorney in Fact.

1536 IN THE DISTRICT COURT OF THE UNITED STATES,

For the Northern District of Illinois,

Eastern Division.

CERTIFICATE OF MAILING.

I, Hoyt King, Clerk of the United States District Court, for the Northern District of Illinois, Eastern Division, keeper of the Seal and Records of said Court, do hereby certify that on the 26th day of March, 1942, in accordance with Rule 73 (b) of the Rules of Civil Procedure for District Courts of the United States, I did cause to be mailed a copy of the foregoing Notice of Appeal to the following attorneys of record:

Hoyt King.
Hoyt King, Clerk.

Langdon Moore, 53 West Jackson Blvd., 1132, Chicago, Illinois.
L. Kerans Moore, 53 West Jackson Blvd., Chicago, Illinois
(Seal)

1537 And on, to wit, the 7th day of April, A. D. 1942, came the Complainant Appellant by its attorneys and filed in the Clerk's office of said Court its certain Notice of appeal in words and figures following, to wit: Filed April 7, 1942

1538 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

NOTICE OF APPEAL.

Notice is hereby given that The Mercoid Corporation, complainant in Consolidated Cause No. 1839, hereby appeals to the Circuit Court of Appeals for the Seventh Circuit, from that part of the Final Decree entered herein on the 24th day of March, 1942:

Dismissing its complaint for a declaratory decree (Civil Action No. 1839, Equitable Relief Sought) for want of equity;

Adjudging Letters Patent No. 1,813,732 to Edward E. Freeman discloses invention and is valid (Civil Action No. 1839) and particularly as to claims 1, 4, 6 and 9 relied upon by Minneapolis-Honeywell (Civil Action No. 1842);

Adjudging The Mercoid Corporation is a contributory infringer of claims 1, 4, 6 and 9 of the Freeman patent;

Dismissing the complaint of Minneapolis-Honeywell
1539 Regulator Company in Minneapolis-Honeywell Regulator Company vs. The Mercoid Corporation (Civil Action No. 1842), consolidated with Civil Action No. 1839, without passing upon the counterclaim for a declaratory decree filed therein by The Mercoid Corporation, and

Adjudging each of the parties pay one-half of the taxable costs.

Langdon Moore,
L. Kerans Moore,
Attorneys for The Mercoid Corporation,
53 West Jackson Boulevard,
Chicago, Illinois.

Dated:
Chicago, Illinois,
April 7, 1942.

Filed May 12, 1942

1540 And on, to wit, the 12th day of May, A. D. 1942, came the Appellant by its attorneys and filed in the Clerk's office of said Court its certain Points on Which It Will Rely in words and figures following, to wit:

1541 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

POINTS TO BE RELIED UPON BY THE MERCOID CORPORATION.

1. The Court erred in finding the Freeman patent discloses invention over the prior patented art, publications and drawings relied upon by The Mercoid Corporation and that the Freeman patent is valid.

2. The Court erred in finding the prior public uses relied upon by The Mercoid Corporation were not installed in their present condition prior to January 16, 1931, the filing date of the Freeman patent.

3. The Court erred in adjudging The Mercoid Corporation is a contributory infringer of claims 1, 4, 6 and 9 of the Freeman patent.

4. Having found the Freeman patent is not a patent on either the fan switch, or the limit switch, or both of them, but a patent on a system of furnace control which requires three thermostats for its operation, the Court erred in not finding that, prior to January 16, 1931, the filing date of the Freeman patent, Williams Oil-O-Matic Heating Corporation had suggested in its Sheets A-198, dated May 5, 1927 (Mercoid Exhibit F-1) and JA-258, dated June 4, 1930 (Mercoid Exhibit G-1), the use of three thermostats for the operation of a system of furnace control defined in the claims of the Freeman patent.

1542 5. The Court erred in not finding that prior to January 16, 1391, the filing date of the Freeman patent, the Portner diagram (Mercoid Exhibit JJJ) accompanying the Portner letter, dated November 28, 1928 (Mercoid Exhibit HH), disclosed the use of three thermostats for the operation of a system of furnace control defined by the claims of the Freeman patent.

6. The Court erred in not finding the heating system installed in the Evangelical Church, Bloomington, Illinois, followed the suggestion of Williams Oil-O-Matic Heating Corporation combining the use of a room thermostat and

limit control as shown in Williams Oil-O-Matic Sheet No. A-150, dated December 24, 1925, with the use of a fan switch shown in Williams Oil-O-Matic Sheet No. A-67, dated October 19, 1926 (Mercoid Exhibit E-2).

7. The Court erred in finding the Evangelical Church heating system (Mercoid Exhibits A-1 to 4, inclusive) was not installed prior to the Freeman filing date of January 16, 1931.

8. The Court erred in not finding that a Mercoid Figure 50 with the tube reversed (circuit to close on temperature rise) as a fan control had been installed in the Evangelical Church prior to August, 1929 (Mercoid Exhibit Z).

9. The Court erred in finding the installation in the Evangelical Church was not a public use of more than two years prior to the Freeman filing date of January 16, 1931.

1543 10. The Court erred in finding the installation in the Portner establishment was not a public use prior to the Freeman filing date of January 16, 1931.

11. The Court having found:

(1) that the Teal patent discloses no fan for delivering the heating medium from the furnace to the room or space to be heated and no thermostat in the furnace hood for controlling a fan;

(2) that the Johnson patent 1,602,363, Mercoid's Bulletin D, dated April 1, 1924; Mercoid's Catalog H-3 of 1928, page 28; Oil-O-Matic drawing No. A-150 dated December 24, 1925, and wiring diagram No. 740 on page 31 of Mercoid Catalog H-5 dated 1929, all follow the Teal patent and lack the disclosure of a fan and a thermostat in the furnace hood for controlling a fan;

(3) that Edgecombe Reissue patent No. 15,531 discloses two room thermostats instead of one, as found in Freeman, and it has no limit switch or thermostat in the furnace hood for opening the circuit passing through the motor which drives the burner upon temperature rise in the furnace hood beyond a safe limit;

(4) that Mercoid's illustration No. 4 of Bulletin A-5 dated June 1930 discloses only a portion of the Edgecombe patent and differs from Freeman in that there is no disclosure of a limit switch or a combustion motor;

(5) that the Cross patent No. 1,758,146 differs from Freeman in that it has neither a fan thermostat nor a limit thermostat in the furnace hood;

1544 the Court erred in not finding Freeman had merely exercised mechanical skill in combining the disclosures of Teal, Edgecombe, Cross and Mercoid to produce a system of furnace control as disclosed in the Williams Sheets A-198 and JA-258 before the filing date of Freeman.

12. The Court having found:

(1) that Mercoid's drawing 266 dated September 27, 1927, differs from Freeman in that the limit switch is out into the circuit ahead of the room thermostat and this brings about an entirely different sequence of operation;

(2) that Drawing No. 748 of Mercoid Catalog No. H-5 of 1929 also places the limit switch ahead of the room thermostat, making an entirely different sequence of operation from that of Freeman;

(3) that neither Mercoid drawing No. 266 of September 27, 1927, nor drawing 748 of Mercoid Catalog H-5 of 1929 shows a limit switch between the room thermostat and combustion motor, as does Freeman,

the Court erred in not finding Freeman had merely exercised mechanical skill in placing the room thermostat in a system of furnace control in circuit ahead of the limit control and fan control as disclosed in Williams Sheets A-198 and JA-258 and in the Portner wiring diagram, which disclosures produce the same sequence of operation as Freeman, before the filing date of Freeman.

13. In view of the suggested wiring diagrams of Williams Oil-O-Matic Sheets A-198 and JA-258 and the
1545 wiring diagram of Portner suggested to The Mercoid Corporation, the Court erred in finding the sale of the Mercoid M-80 is a contributory infringement of claims 1, 4, 6 and 9 of the Freeman patent.

14. The Court erred in dismissing the complaint for declaratory decree that the claims of the Freeman patent were invalid after the admission by Minneapolis-Honeywell Regulator Company that claims 2, 5, 7 and 10 were invalid.

15. Having found that Minneapolis-Honeywell Regulator Company had used its Freeman patent so as to tend to create a monopoly in an unpatented article, the Court erred in not finding Minneapolis-Honeywell Regulator Company had violated the Anti-Trust Law of the United States.

16. Having found Minneapolis-Honeywell Regulator Company had licensed others under the Freeman patent to manufacture, use and sell an unpatented device, the Court erred in not finding Minneapolis-Honeywell Regulator Company had violated the Anti-Trust Law of the United States.

17. The Court erred in dismissing the complaint for declaratory decree of The Mercoid Corporation and not adjudging that complainant has the right to manufacture and sell its fan and limit controls, M-80, without molestation by the defendant.

18. The Court erred in dismissing the complaint for a declaratory decree of The Mercoid Corporation and not finding the defendant be restrained and enjoined from bringing suit for infringement of said Freeman patent against the purchasers of the combination fan and limit controls, M-80, for the purpose of resale, or directly
1546 or indirectly threatening such customers, or prospective customers, of The Mercoid Corporation with suit for infringement of said Freeman patent, or from in any manner interfering with the business of The Mercoid Corporation in the manufacture and sale of its fan and limit controls, M-80, by the use of the Freeman patent.

19. Having adjudged Minneapolis-Honeywell Regulator Company has been so using its Freeman patent as to tend to create a monopoly in an unpatented device and having dismissed Minneapolis-Honeywell Regulator Company's suit for infringement of the Freeman patent for want of equity (Cause No. 1842), the Court erred in not passing upon the counterclaim for a declaratory decree forming a part of The Mercoid Corporation's answer thereto.

20. The Court erred in finding the defense of Mercoid of laches by Minneapolis-Honeywell Regulator Company has not been established since there are no elements of estoppel involved and mere delay does not constitute a defense.

21. The Court erred in not finding the claims of the Freeman patent do not cover any valid and patentable combination, but embody merely aggregations of elements having no true or proper relation in a patentable sense, and that the claims do not cover, embody or constitute patentable subject matter and are therefore invalid in accordance with the Statutes and Laws of the United States.

22. The Court erred in not finding that the instructions to customers set forth in The Mercoid Corporation's
1547 correspondence during the years 1926, 1927, 1928 and 1929, described a system of furnace control as defined in the claims of the Freeman patent.

23. The Court erred in not finding that Minneapolis-Honeywell Regulator Company, by the use of its Freeman

patent, had entered into unfair competition with The Mercoid Corporation.

24. The Court erred in not finding that Minneapolis-Honeywell Regulator Company had deliberately conspired with its licensees and said licensees and Minneapolis-Honeywell Regulator Company have wilfully and unlawfully conspired among themselves to substantially lessen competition and establish a monopoly in the sale of furnace controls in restraint of trade and in violation of the Anti-Trust Law.

25. The Court erred in not entering a decree that an accounting be awarded to The Mercoid Corporation for Minneapolis-Honeywell Regulator Company's profits, gains and advantages and the damage sustained by The Mercoid Corporation because of the wrongful acts of Minneapolis-Honeywell Regulator Company.

26. The Court erred in not adjudging The Mercoid Corporation is entitled to injunctive relief under the Anti-Trust Law of the United States.

27. The Court erred in not finding Minneapolis-Honeywell Regulator Company has violated the Anti-Trust Law of the United States by establishing a price upon an unpatented article.

1548 28. The Court erred in adjudging that each of the parties pay one-half of the taxable costs.

The Mercoid Corporation,
By Langdon Moore,
L. Kerans Moore,
Its Attorneys,
53 West Jackson Boulevard,
Chicago, Illinois.

Dated: Chicago, Illinois,
5-12, 1942.

1549 IN THE DISTRICT COURT OF THE UNITED STATES,

For the Northern District of Illinois,

Eastern Division.

CERTIFICATE OF MAILING.

I, Hoyt King, Clerk of the United States District Court, for the Northern District of Illinois, Eastern Division, keeper of the Seal and Records of said Court, do hereby certify that on the 8th day of April, 1942, in accordance with Rule 73 (b) of the Rules of Civil Procedure for District Courts of the United States, I did cause to be mailed a copy of the foregoing Notice of Appeal to the following attorneys of record:

Bair & Freeman,
135 S. LaSalle Street, 1400,
Chicago, Illinois.

(Seal) Hoyt King, Clerk.

1550 And on, to wit, the 7th day of April, A. D. 1942, came the Complainant-Appellant by its attorneys and filed in the Clerk's office of said Court its certain BOND ON APPEAL in words and figures following, to wit:

Filed April 7, 1942

1551 Know All Men By These Presents:

That we, The Mercoid Corporation, as principal, and Hartford Accident and Indemnity Company, as sureties, are held and firmly bound unto Minneapolis-Honeywell Regulator Company in the full and just sum of Two Hundred and Fifty and no/100 ($250.00) Dollars to be paid to the said Minneapolis-Honeywell Regulator Company, its attorneys, executors, administrators, or assigns; to which payment, well and truly to be made, we bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents. Sealed with our seals and dated this 6th day of April, in the year of our Lord one thousand nine hundred and forty two.

Whereas, lately at a session of the District Court of the United States for the Northern District of Illinois, Eastern Division, in a suit pending in said Court, between The Mercoid Corporation, plaintiff, and Minneapolis-Honeywell

Regulator Company, defendant, a decree was rendered against said The Mercoid Corporation, and said The Mercoid Corporation having filed its notice of appeal to the United States Circuit Court of Appeals for the Seventh Circuit in the Clerk's Office of the said District Court to reverse the decree of the aforesaid suit in the United States Circuit Court of Appeals for the Seventh Circuit, to be holden at Chicago within forty days from the date hereof.

Now, the condition of the above obligation is such, that if said The Mercoid Corporation shall prosecute its said appeal to effect, and shall answer all damages and
1552 costs that may be awarded against it if it fail to make its plea good, then the above obligation to be void; otherwise to remain in full force and virtue.

The Mercoid Corporation.
By Hugh Courteol,
President.

(Seal)
Attest:
J. F. Chambliss,
Secretary.

Hartford Accident and Indemnity Company,
By Arthur A. Noll,
Its Attorney-in-Fact.

(Seal)

State of Illinois }
County of Cook } ss.

On this 6th day of April, A. D. 1942, before me the undersigned, a Notary Public, within and for the said county and state, personally appeared Hugh Courteol, President, and J. F. Chambliss, Secretary, of the above named The Mercoid Corporation, to me known to be the persons who executed the foregoing instrument, and to me known to be such President and Secretary of said corporation, and ac-
1553 knowledged that they executed the foregoing instrument as such officers as the deed of said corporation, by its authority.

Albert Schiff,
Notary Public.

(Seal)

State of Illinois)
County of Cook) ss.

On this 6th day of April, A. D. 1942, before me, the undersigned, a Notary Public, within and for said county and state, personally Arthur A. Noll, Attorney-in-Fact of the above named Hartford Accident and Indemnity Company to me known to be the person who executed the foregoing instrument, and to me known to be such Attorney-in-Fact of said corporation, and acknowledged that he executed the foregoing instrument as such Attorney-in-Fact, as the deed of said corporation, by its authority.

Beryl M. Radcliffe,
(Seal) Notary Public.

1554 And on, to wit, the 26th day of March, A. D. 1942, came the Defendant by its attorneys and filed in the Clerk's office of said Court its certain Designation of Portions of the Record in words and figures following, to wit:

Filed March 1942

1555 IN THE UNITED STATES DISTRICT COURT.

(Caption—1839)

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY'S DESIGNATION OF THE PORTIONS OF THE RECORD, PROCEEDINGS AND EVIDENCE TO BE CONTAINED IN THE RECORD ON APPEAL.

The Clerk will please prepare the record on appeal herein and include the following, with filing dates of the pleadings (Pleadings in Civil Action No. 1842 only):

1. Complaint, including Ex. 1, the Freeman patent No. 1,813,732, and omitting verification and other exhibits attached.
2. Defendant's (Mercoid) Motion for Bill of Particulars (omitting attached exhibits).
3. Plaintiff's Bill of Particulars.
4. Defendant's Interrogatories.
5. Plaintiff's Answers to Defendant's Interrogatories (omitting the exhibits attached; Ex. A attached is Mercoid's Ex. LL; the Cook license attached is the same in all pertinent respects as Mercoid's Ex. HH; the Penn Electric Switch Co., Perfex Corporation, Bendix Aviation Corporation and White-Rodgers Electric Co. licenses attached are the same in all pertinent respects as Mercoid Ex. JJ).

1556 6. Answer with Counterclaim (omitting verification and exhibits attached). (Exs. B, C, Price Schedule, D & G are identical in all pertinent respects with Exs. GG, HH, LL, QQ and II respectively).

7. Amendment to Answer with Counterclaim.

8. Reply to Counterclaim.

9. Request for Admission of Facts and Genuineness of Documents under Rule 75, Rules of Civil Procedure.

10. Order for Consolidation, entered in Case No. 1842 and Case No. 1839, on June 20, 1941.

11. Memorandum entered by Judge Barnes February 27, 1942.

12. Findings of Fact and Conclusions of Law.

13. Final Degree.

14. Notice of Appeal.

15. Bond.

16. Statement of Points to be Relied Upon.

17. That portion of the Reporter's typewritten transcript of the proceedings at the trial, comprising:

Pages 41 to 65 inclusive, omitting last two lines of page 65.

Page 66, last 5 lines only.

Pages 67 to 100, omitting last three lines.

Pages 101 to 131, inclusive.

Pages 644 to 682, inclusive.

Page 814, last eleven lines.

Pages 815 to 820, omitting last eight lines.

1557 18. Minneapolis-Honeywell Regulator Company's documentary exhibits, as follows:

Ex. 1-A, Mercoid Corporation "Installation Instructions", May, 1940, Form L-4.

Ex. 7, Mercoid Combination Fan and Limit Control for Warm Air Furnaces, Bulletin M-12.

Ex. 13, Sequence Drawing of Freeman patent.

Ex. 30, Letter April 18, 1939, from Minneapolis-Honeywell to Perfex Corporation.

Ex. 31, Letter September 5, 1940, from Perfex to Minneapolis-Honeywell; Letter September 6, 1940, Minneapolis-Honeywell to Perfex; corrected letter of August 20, 1940.

19. Mercoid Corporation's documentary exhibits, as follows:

Ex. T, Minneapolis-Honeywell catalog 1940, cover and page 40.

Ex. GG, January 24, 1940, Letter, Minneapolis-Honeywell to Mercoid.

Ex. HH, typewritten copy proposed license Minneapolis-Honeywell to Mercoid.

Ex. II, May 7, 1940, letter, Minneapolis-Honeywell to Detroit Lubricator and Mercoid, with two letters attached.

Ex. JJ, Minneapolis-Honeywell printed license under Freeman patent.

Ex. LL, Price schedule, used with all licenses under Freeman patent.

Ex. QQ, June 21, 1940, letter, Minneapolis-Honeywell to Mercoid.

Ex. RR, June 28, 1940, letter, Mercoid to Minneapolis-Honeywell.

Ex. SS, October 7, 1940, letter, Minneapolis-Honeywell to Mercoid.

1558 20. Minneapolis-Honeywell Regulator Company's physical exhibits (to be forwarded to the Clerk of the Seventh Circuit Court of Appeals):

Ex. 15, Demonstration Model, including Minneapolis-Honeywell commercial control marketed under Freeman patent.

Ex. 17, Colored photograph of the demonstration model of Ex. 15.

Ex. 18, Demonstration Model, including a specimen of Mercoid's M-80 accused control.

Ex. 20, Colored photograph of Ex. 18 Demonstration Model.

21. Mercoid Corporation's physical exhibits (to be forwarded to the Clerk of the Seventh Circuit Court of Appeals):

Ex. PPP, Mercoid Type M-80 accused control (separate control, like the M-80 used in M-H Ex. 18).

22. This Designation.

23. Clerk's Certificate.

Minneapolis-Honeywell Regulator Company,
By Bair & Freeman,
Its Attorneys.

W. P. Bair,
Will Freeman,
George Fisher,
Of Counsel.

Dated:
Chicago, Illinois,
March 26th, 1942.

Filed May 12, 1942

1559 And on, to wit, the 12th day of May, A. D. 1942, came the Appellant by its attorneys and filed in the Clerk's office of said Court its certain Designation of Contents of Record in words and figures following, to wit:

1560 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

THE MERCOID CORPORATION'S DESIGNATION OF THE PORTIONS OF THE RECORD, PROCEEDINGS AND EVIDENCE TO BE CONTAINED IN THE RECORD ON APPEAL.

The Clerk will please prepare the record on appeal herein and include the following, with filing dates of the pleadings (Pleadings in Civil Action No. 1839 only):

1. Complaint for Declaratory Decree (omitting attached Verification and exhibits) filed June 29, 1940.
2. Answer filed July 19, 1940.
3. Complainant's (Mercoid) Interrogatories filed August 12, 1940.
4. Defendant's (Minneapolis) Interrogatories filed August 20, 1940.
5. Minneapolis' Answer to Complainant's Interrogatories filed August 28, 1940 (omitting attached exhibits).
6. Mercoid's Answer to Minneapolis' Interrogatories filed September 3, 1940 (omitting attached exhibits).
7. Amendment to Bill of Complaint filed October 3, 140.

1561 8. Minneapolis' Amendment to Answer filed October 17, 1940.

9. Supplemental Complaint (omitting attached exhibits) filed January 7, 1941.
10. Minneapolis' Reply to Supplemental Complaint filed January 27, 1941.
11. Mercoid's Request for Admission of Facts and Genuineness of Documents filed February 20, 1941.
12. Amendment to Supplemental Complaint filed November 12, 1941.
13. Notice of Appeal, April 7, 1942.
14. Bond.
15. Statement of Points to be Relied Upon.
16. That portion of the Reporter's typewritten transcript of the proceedings at the trial comprising:

Page 133, last 13 lines only.
Page 134 to 138, inclusive, including only the first four lines on page 138.
Page 139, omitting first seven lines.
Page 140 to 153, including first seven lines only on page 153. (Introduction and excerpts of the typewritten depositions of Willard L. Huff and Harold W. Sweatt.)
Page 153, including last 10 lines only.
Pages 154 to 193, omitting last three lines on page 193.
1562 Page 194, last seven lines only.
Pages 195 to 261, omitting last five lines on page 261.
Page 262, last six lines only.
Pages 263 to 306, omitting last three lines on page 306.
Page 307, last six lines only.
Page 308 to 362, omitting last four lines on page 362.
Page 363, last six lines only.
Pages 364 to 398, omitting first five lines on page 398.
Pages 399 to 418, omitting last four lines on page 418.
Page 419, last six lines only.
Pages 420 to 458, including the first six lines only on page 458.
Page 557, omitting the first six lines.
Pages 558 to 566, omitting the last five lines on page 566.
Page 600, last three lines only.
Pages 601 to 626, omitting last five lines on page 626.
Page 627, last 10 lines only.
Page 628, omitting first two lines.
Page 629 to 643, omitting last 11 lines on page 643. (Testimony of Frank Black.)
Pages 459 to 461, inclusive. (Testimony of Paul Brodersen.)
Page 462, omitting first three lines.
Pages 463 to 488, omitting last two lines on page 488.
Page 489, last five lines only.
1563 Page 490 to 525, omitting last five lines on page 525.
Page 567, omitting first six lines.
Page 568 to 600, including first 10 lines only on page 600. (Testimony of J. A. Portner.)
Page 526 to 542, omitting last four lines on page 542.
Page 543, last six lines only.
Page 544 to 556, omitting last four lines on page 556. (Testimony of Charles Hill.)

Page 683 to 688, inclusive, omitting last two lines on page 688.
Page 689, last 12 lines only.
Page 690 to 691, omitting last two lines on page 691. (Introduction of Bloomington depositions and reference to Owens' interpretation of dates.)
Page 692, omitting first two lines.
Page 693 to 749, omitting the last five lines on page 749.
Page 750, last six lines only.
Page 751 to 787, including the first six lines only on page 787. (Testimony of Harry R. Van Deventer.)
Pages 825 to 831, first three lines only on page 831. (Statement as to dates as interpreted by James W. Owens.)

1564 17. That portion of the Bloomington depositions (Mercoid Exhibit A) comprising:
Beginning with Q. 1 on Page 45 through A. 8 on Page 46:
Beginning with Q. 38 on Page 52 through A. 143 on Page 68.
Beginning with Q. 160 on Page 70 through A. 242 on Page 86.
Beginning with Q. 289 on Page 95 through A. 374 on page 114. (Testimony of O. H. Price.)
Beginning with Q. 1 on Page 154 through A. 79 on Page 161.
Beginning with Q. 83 on Page 162 through A. 218 on Page 182. (Testimony of Louis H. Lartz.)

18. The Mercoid Corporation's documentary exhibits as follows:
Exhibits A-1-2-3-4, Photographs of Installation in Evangelical Church.
Exhibits C-1-2-3, Invoices to Evangelical Church from records of Williams Oil-O-Matic.
Exhibit D-4, Ledger sheet from records of Williams Oil-O-Matic.
Exhibit E-2, Installation and Service Manual of Williams Oil-O-Matic, Cover, Index Sheets 1 and 2, Sheet A-67, Sheet A-150 only.
Exhibit F-1, Sheet A-198 wiring diagram.
Exhibit F-3, Sheet A-198 wiring diagram colored.
Exhibit G-1, Sheet No. JA-258 wiring diagram.
Exhibit G-4, Sheet No. JA-258 wiring diagram colored.

Exhibit H-3, Wiring diagram of installation Evangelical Church colored.
Exhibit L, Baker patent No. 2,230,446.
Exhibit N, Agreement: Minneapolis-Honeywell Regulator Company and Cook Electric Company re Baker patent.
1565 Exhibit R-1, Mercoid Manufacturer's Purchase Contract, 1938.
Exhibit R-2, Mercoid Manufacturer's Purchase Contract, 1939.
Exhibit R-3, Mercoid Manufacturer's Purchase Contract 1940.
Exhibit S, Minneapolis-Honeywell Regulator Company letter November 28, 1932.
Exhibit U, Bulletin D, Federal Mercoid Controls, Date Sheet No. 1, Cover only.
Exhibit V, Mercoid Bulletin E, June 1924, four sheets.
Exhibit X, Mercoid Catalog H-3, 1928, Title page and pages 10, 18, 23 and 28.
Exhibit Y, Mercoid Catalog No. H 5, 1929, Cover, Pages 7, 10, 24, 25, 31 and 32 only.
Exhibit Z Mercoid Bulletin S-83, four pages.
Exhibit AA, Mercoid Bulletin A-5, four sheets.
Exhibit BB, Mercoid Bulletin A-14, Cover and pages 1 and 7 only.
Exhibit CC, Mercoid Bulletin M-12.
Exhibit EE, Mercoid Installation Instructions Form P-55, September 1934, Sheet with wiring diagram only.
Exhibit KK, Minneapolis-Honeywell License to Cook Electric Company, March 31, 1939.
Exhibit MM, Letter from Thiess, Olson and Mecklenburger.
Exhibit WW, McCabe patent No. 1,734,015.
Exhibit XX, Mercoid Drawing No. 266.
1566 Exhibit ZZ, McCabe patent No. 1,817,634.
Exhibit AAA, McCabe patent No. 1,834,288.
Exhibit CCC, Peninsula Burner correspondence, 1926.
Exhibit DDD, Miller Automatic Service correspondence 1926.
Exhibit EEE, Carbon copy letter to Premier Warm Air Heater Company April 22, 1927.

Exhibit FFF, Carbon copy letter to Socony Burner Corp. December 29, 1927.
Exhibit GGG, The XXth Century Heating and Ventilating Company correspondence 1928.
Exhibit HHH, Holland Furnace Company correspondence 1929.
Exhibit III, J. A. Portner letter November 22, 1928.
Exhibit JJJ, J. A. Portner wiring diagram.
Exhibit KKK-1 Mercoid Invoice to J. A. Portner.
Exhibit LLL, Portner letter announcing opening and carbon copy of letter to Portner March 5, 1929.
Exhibit MMM-1-2-3-4, Photographs of installation on J. A. Porter's establishment.
Exhibit NNN-1, Johnson Patent No. 360,223.
Exhibit NNN-2, Kilbourn patent.
Exhibit NNN-3, Cross patent.
Exhibit NNN-4, Kuntz patent.
Exhibit NNN-5, Teal patent.
Exhibit NNN-6, Johnson patent No. 1,602,363.
Exhibit NNN-7, Sweatt patent.
Exhibit NNN-8, Edgecombe reissue patent.

1567 19. The Mercoid Corporation's physical exhibits as follows:
Exhibit BB-1, Enlarged wiring diagram No. 3 with circuits in color.
Exhibit CC-1, Enlarged wiring diagram Mercoid Bulletin M-12 with circuits in color.
Exhibit EE-1, Enlarged wiring diagram Form P-55 with circuits in color,
Exhibit VV, Enlarged Figure 2 of Freeman patent with circuits in color,
Exhibit YY, Enlarged Mercoid Drawing No. 266 with circuits in color.
Exhibit JJJ-1, Enlarged wiring diagram Portner installation with circuits in color.
Exhibit OOO, Mercoid Instrument M-51.
Exhibit OOO-1, Mercoid Instrument M-53.
Exhibit OOO-2, Mercoid Instrument M-52.
Exhibit QQQ, Enlarged drawing with three circuits in color.

20. Order: Physical Exhibits of The Mercoid Corporation be sent to the Circuit Court of Appeals. (Entered April 22, 1942.)

21. This designation of record.
22. Order: Entered April 27, 1942.
23. Clerk's Certificate.

The Mercoid Corporation.
By Langdon Moore,
L. Kerans Moore,
Its Attorneys.
53 West Jackson Boulevard,
Chicago, Illinois.

Dated:
Chicago, Illinois,
May 12, 1942.

1568 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY'S DESIGNATION OF ADDITIONAL PORTIONS OF RECORD, PROCEEDINGS, AND EVIDENCE TO BE CONTAINED IN THE RECORD OF THE MERCOID CORPORATION'S APPEAL.

The Clerk will please include the following portions in addition to those heretofore designated by The Mercoid Corporation:

1. That part of the portion of the Reporter's Typewritten Transcript of the proceedings at the trial comprising—
Page 787, last 11 lines;
Pages 788 to 798, omitting last 8 lines;
Page 799, last 8 lines only;
Page 800, first 8 lines;
Page 802, last 7 lines only;
Pages 803 to 814, except last 11 lines.

2. That part of Mercoid's Exhibit A (Bloomington depositions), and in addition to those parts already designated by Mercoid, comprising—

1569 Page 18, the name of the witness Hopkins, and the last 6 lines;
Pages 19 to 28;
Pages 30 to 40;
Page 68, except first 5 lines;
Page 69;
Page 70, first 8 lines;
Page 86, except first 8 lines;

Pages 87 to 94;
Page 95, except last 7 lines;
Page 115, last 10 lines;
Pages 116 to 152;
Page 153, first 2 lines;
Page 182, except first 7 lines;
Pages 183 to 232;
Page 233, except last 4 lines.

3. That part of Minneapolis-Honeywell's Exhibit 32 (depositions of McCabe and Courteol), comprising—

Page 8, omitting the first 6 lines;
Page 9, first 2 lines;
Page 10, omitting first 7 lines;
Page 11, first 6 lines and last 3 lines;
Pages 12 to 15;
Page 16, omitting last 6 lines;
Page 17, omitting first 12 lines;
Page 18;
Page 19, omitting last 8 lines;
Page 35, last 9 lines;
Page 36, first 5 lines;
Page 37, omitting first 4 lines;
1570 Pages 38 to 46;
Page 47, omitting last 10 lines;
Page 49, last 2 lines;
Pages 50 to 56;
Page 57, omitting last 7 lines;
Page 68, omitting first lines;
Pages 69 to 71;
Page 72, first 6 lines;
Page 81, last 3 lines;
Page 82, first 7 lines;
Page 95, omitting first 11 lines;
Page 96, omitting first 12 lines;
Page 97, first 9 lines;
Page 116, name of witness Courteol, and Question 95 and Answer thereto;
Page 148, Question 449 and Answer thereto;
Page 150, last 12 lines;
Page 151;
Page 152, omitting last 7 lines.

4. That part of Minneapolis-Honeywell's Exhibit 33 (Barr deposition) comprising—

Page 2, omitting first 4 lines;
Page 3;

Page 5;
Page 6, last 3 lines;
Pages 7 and 8;
Page 10, omitting last 3 lines;
Page 11, last 2 lines.

1571 5. Minneapolis-Honeywell's documentary exhibits, comprising—

Exhibit 1-B, Installation Instruction Bulletin, Form P-55-A, Feb. 1940;
Exhibits 2-A to 2-G, inclusive, Drawings referring to Illustration No. 7, wiring hook-up or circuit for M-80 as recommended by Mercoid;
Exhibit 3, group of 8 drawings, reproduced from Illustration No. 8 of M-H Ex. 1-A;
Exhibit 6, Mercoid drawing No. 962;
Exhibit 8, Mercoid Catalog No. 300;
Exhibit 9, Mercoid Catalog No. 400;
Exhibit 12, M-H drawing illustrating XX Century correspondence (Mercoid's Exhibit GGG);
Exhibit 26, Copy of Time-O-Stat Controls Co. name plate drawing N-350, March 11, 1929;
Exhibit 28, Drawing No. N-223 of name plate, March 13, 1929.
Exhibit 29, Drawing of N-350 of name plate, March 3, 1931.

6. Minneapolis-Honeywell's physical exhibits, comprising—

Exhibit 10, Booklet, "Mercoid Wiring Diagrams for Oil Burner Installations";
Exhibit 11, Booklet, Mercoid, with respect to stoker installations;
Exhibit 21, Drawing, Mercoid Control of M-H Ex. 1-A, and claim block referring to claim 4 of Freeman;
Exhibit 22, Drawing (of Ex. 21) and claim block referring to claim 9 of Freeman;
Exhibit 23, Chart of drawing No. 2403 in M-H Exhibit 10;
Exhibit 24, Claim block of Claim 6 of Freeman;

1572 Exhibit 25, Name plate corresponding to name plate on device in Portner installation;
Exhibit 27, Calibration plate of No. 56 instrument corresponding to plate at Portner installation.

7. Mercoid Corporation's documentary exhibits, comprising—

Exhibits B-1 and B-2, photographs of Ned Dolan residence installation (10-2-40);
Exhibit D-1, Williams Oil-O-Matic invoice to Ned Dolan (7-27-26);
Exhibit D-2, Williams Oil-O-Matic invoice to Ned Dolan (4-11-27);
Exhibit D-3, Williams Oil-O-Matic invoice to Ned Dolan (6-1-26);
Exhibit H-1, Williams Oil-O-Matic Drawings (10-2-1940) of Evangelical Church Installation;
Exhibit H-2, Williams Oil-O-Matic Drawings of Evangelical Church Installation;
Exhibit H-4, Williams Oil-O-Matic Drawings of Evangelical Church Installation;
Exhibit I-1, Williams Oil-O-Matic Drawing (Oct. 2, 1940) of Ned Dolan Installation;
Exhibits I-2 to I-6, inclusive, Williams Oil-O-Matic Drawings of Ned Dolan Installation;
Exhibit J-1, Minneapolis-Honeywell Catalog, (5-28), pages 2, 26 and back;
Exhibit J-3, Minneapolis-Heat Regulator Catalog; cover, title page and page 18;
Exhibit J-4, Heating Specialties Catalog; title page and page 22;
Exhibit O, Chicago Depositions of Willard L. Huif and Harold W. Sweatt; pages 3 to 27 inclusive;
Exhibit RRR, Time-O-Stat Catalog; Cover, title page O-1 and pages O-26 and O-27.

1573 8. Mercoid Corporation's physical exhibit, comprising—
Exhibit TTT (8 invoices to Portner).

9. This Designation.

Minneapolis-Honeywell Regulator Company,
By (s.) Bair & Freeman,
Its Attorneys.

Of Counsel:
(s.) Bair &
(s.) Will Freeman.
(Chicago, Illinois,
May 16, 1942.)

1574 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

AMENDMENT TO MERCOID'S DESIGNATION OF THE PORTIONS OF THE RECORD, PROCEEDINGS AND EVIDENCE TO BE CONTAINED IN THE RECORD ON APPEAL.

The Clerk will please include the following portions in addition to those heretofore designated by The Mercoid Corporation and those included in the additional designation of Minneapolis-Honeywell Regulator Company:

1. That portion of the Mercoid's Exhibit A (Bloomington depositions), omitted from Minneapolis-Honeywell's additional designation, comprising:

Page 15, omitting first 10 lines.
Page 16.
Page 41, first 8 lines only.
Page 42, omitting first 10 lines.
Page 43.
Page 44, first line only.

2. That portion of Minneapolis-Honeywell's Exhibit 32 (depositions of McCabe and Courteol), omitted from Minneapolis-Honeywell's additional designation, comprising:

Page 23, omitting line 1 and last 6 lines.
Page 24, first 8 lines only.
Page 25, last 2 lines.

1575 Page 26 to and including page 35 to line 9 from bottom.
Page 72 omitting first 6 lines.
Pages 73 to 81, inclusive, omitting last 3 lines from bottom.
Page 82 omitting first 7 lines.
Pages 83 to 88, inclusive.
Page 89 first 2 lines.
Pages 90 to 94, inclusive.
Page 95 including first 11 lines.
Page 96 first 11 lines.
Page 98 omitting first 11 lines.
Pages 99 to 120, inclusive.
Page 124 omitting first 8 lines.
Pages 125 to 147, inclusive.
Page 148, first 9 lines and last 2 lines.

Page 149.
Page 150 omitting last 12 lines.
3. This designation.

The Mercoid Corporation,
By LANGDON MOORE,
L. Kerans Moore,
Its Attorneys,
53 West Jackson Boulevard,
Chicago, Illinois.

Dated: Chicago, Illinois,
May 18, 1942.

Filed April 22, 1942

1576 And afterwards, to wit, on the 22nd day of April, A. D. 1942, being one of the days of the regular April term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable John P. Barnes, District Judge, appears the following entry, to wit:

1577 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

ORDER.

Upon motion duly made under Rule 75(i), it is hereby ordered that the following physical exhibits of The Mercoid Corporation introduced at the trial of the above entitled cause of action be sent to the Circuit Court of Appeals for the Seventh Circuit in order that the same may be inspected by the appellate court:

Exhibit BB-1, Enlarged wiring diagram No. 3 with circuits in color.
Exhibit CC-1, Enlarged wiring diagram Mercoid Bulletin M-12 with circuits in color.
Exhibit EE-1, Enlarged wiring diagram Form P-55 with circuits in color.
Exhibit VV, Enlarged Figure 2 of Freeman patent with circuits in color.
Exhibit YY, Enlarged Mercoid Drawing No. 266 with circuits in color.
Exhibit JJJ-1, Enlarged wiring diagram Portner installation with circuits in color.
Exhibit OOO, Mercoid Instrument M-54.
Exhibit OOO-1, Mercoid Instrument M-53.

1578 Exhibit OOO-2, Mercoid Instrument M-52.
Exhibit PPP, Mercoid Instrument M-80.
Exhibit QQQ, Enlarged wiring diagram with three circuits in color.

Barnes,
Judge of the United States District Court.

Dated: April 22nd, 1942.

1579 And afterwards, to wit, on the 27th day of April, A. D. 1942, being one of the days of the regular April term of said Court, in the record of proceedings thereof, in said entitled cause, before the Honorable John P. Barnes, District Judge, appears the following entry, to wit:

Filed April 27, 1942

1580 IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Caption—1839) * *

ORDER.

Upon all the proceedings had herein and upon the annexed Stipulation, it is hereby ordered that:

The time for docketing the case and filing the record on appeal be and the same is hereby extended to and including May 23, 1942.

Barnes,
United States District Judge.

Dated:
Chicago, Illinois,
April 27th, 1942.

PLAINTIFF'S EXHIBIT 4

FREEMAN PATENT, NO. 1,813,732.

July 7, 1931. E. E. FREEMAN 1,813,732

FURNACE CONTROL

Filed Jan. 16, 1931

FIG. 1

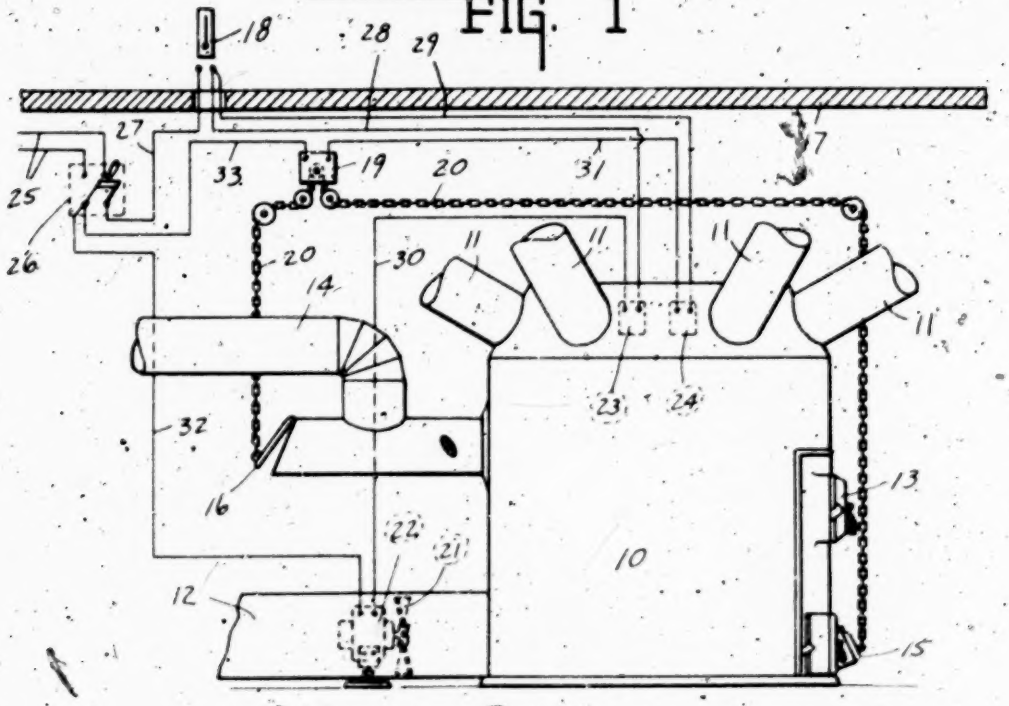
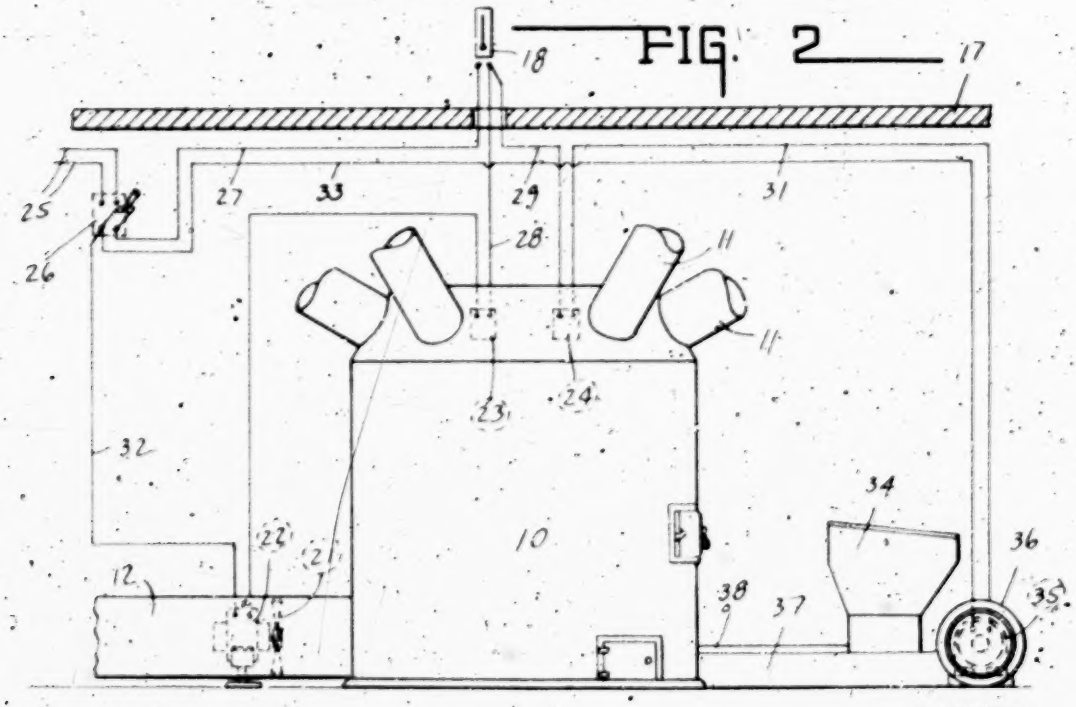


FIG. 2



INVENTOR.
EDWARD E. FREEMAN.

BY
Lockwood Lockwood Goldsmith & Galt
ATTORNEYS.

Patented July 7, 1931 1,813,732

1101

UNITED STATES PATENT OFFICE

EDWARD E. FREEMAN, OF DANVILLE, ILLINOIS

FURNACE CONTROL

Application filed January 16, 1931. Serial No. 509,049.

This invention relates to control apparatus, principally for use with a hot air furnace.

The principal object of the invention is to provide a control for the rate of combustion and for the operation of an accelerating device, such as a fan, blower or similar apparatus, used for accelerating the rate of supply of the heat-conducting medium, such as air, to be heated by the furnace, said control being such as to permit the operation of said accelerating device and to check combustion in case the furnace becomes overheated and such as to interrupt the operation of said accelerating device while increasing the rate of combustion if the furnace has not been heated above a predetermined temperature.

In addition, a control feature is added by means of which both the combustion and the supply of the heat-conducting medium are checked when the temperature of the room or object to be heated is above a predetermined degree.

Other objects and features of the invention will be apparent from the accompanying drawings and the following description and claims:

Figure 1 is an elevational view partly diagrammatic showing the application of the invention to a hand-fired, hot air furnace. Figure 2 is a similar view showing the invention applied to a stoker-fired furnace.

In Figure 1 a furnace 10 is fitted with the usual hot air pipes 11, cold air inlet 12, fire door 13, smoke pipe 14 and draft dampers 15 and 16. The floor of a room to be heated is indicated by the numeral 17 and a thermostat 18 is located within the said room. An electrically-operated damper controller 19 of a common commercial form is connected by means of chains 20 with the dampers 15 and 16 and is adapted to accelerate the combustion by moving the said chains to open damper 15 and close damper 16 when electric current is supplied to said controller. When no current is supplied, the controller operates to check combustion by moving the chains in the opposite direction. A fan 21 and motor 22 are associated with the cold air inlet 12 to accelerate the supply of cold air to the furnace. A pair of thermostatic switches 23 and 24 are located within the hood of the furnace. Suitable electric power for the operation of the damper controller 19 and the fan motor 22 is supplied by means of power mains 25 connected to a knife switch 26. One terminal of the said knife switch is connected by means of a wire 27 to the thermostat 18. The opposite terminal of the thermostat is connected by a pair of wires 28 and 29 to the thermostatic switches 23 and 24 respectively. The opposite terminal of switch 23 is connected by a wire 30 with one terminal of the fan motor 22. The opposite terminal of the switch 24 is connected by a wire 31 with the damper controller 19. The opposite terminals of the fan motor 22 and damper controller 19 are connected to the second terminal of the knife switch by wires 32 and 33 respectively.

In the operation of the apparatus, the fan motor 22 is operated when the following electric circuit is completed: 25, 26, 27, 18, 28, 23, 30, 22, 32, 26, 25. The damper controller 19 is actuated to accelerate combustion when the following circuit is completed: 25, 26, 27, 18, 29, 24, 31, 19, 33, 26 and 25. When this circuit is broken, the damper controller is adapted to move the dampers to check the fire. Since the thermostat 18 is included in both these circuits and since the said thermostat is of the type to open its circuit when the room temperature is above a predetermined value, it is evident that the fan 21 will be stopped and the damper control will operate to check the fire whenever this predetermined room temperature is exceeded.

The switch 23 is of a type which closes its circuit only when a predetermined temperature is exceeded. This temperature is so chosen that the circuit within the switch 23 is only completed when the furnace hood has been heated to a temperature greater than normal room temperature. Thus the fan 21 will not be operated if the furunace has not reached a temperature at which the air would be heated above room temperature. In other words, the fan 21 can never operate to force unheated air into the rooms to be heated while this control is in operation.

For summer use, however, where the fan 21 is to be used for ventilating, suitable electric circuits are provided for short circuiting the switch 23 to permit operation of the fan 21 regardless of the furnace temperature.

The switch 24 is of the type which opens its circuit when a predetermined temperature has been exceeded. This temperature is so chosen that the circuit within the switch is opened when the furnace has been heated to such a point that further heating might prove dangerous. When the circuit is so opened, the damper control operates to check the fire independently of the temperature of the thermostat 18 while the fan motor 22 continues under the control of said thermostat. The fan motor, therefore, continues to operate even though the furnace is overheated so long as the room temperature is not above the degree for which the thermostat 18 is set. The fan 21 thus serves to assist in the cooling of the furnace when the fire has been checked because of overheating.

In Figure 2, the invention is shown applied to a stoker-fired furnace. In the said figure reference numerals refer to parts having similar construction and function to like numbered parts in Figure 1. In addition, there is shown a stoker hopper 34, a stoker motor 35 and fan 36. The fan is driven by the motor 35 and supplies air to the furnace for combustion through a conduit 37. Fuel is supplied from the hopper 34 through a conduit 38 containing suitable conveying apparatus also driven by motor 35. The supply of air and of fuel are, therefore, both accomplished by the operation of the motor 35. Thus combustion within the furnace is accelerated when the motor 35 is operated, and is checked when the motor 35 is stopped. The motor 35 is connected in the wiring in a position corresponding to that of the damper controller 19 and the control of combustion therefor is accomplished in exactly the same manner as with the hand-fired furnace.

By similarly applying the above-described apparatus to the fuel supply system of an oil or gas-fired furnace, the same may be controlled in exactly the same manner. Other variations in the details of the invention are possible without departing from the broader features thereof. For example, the wiring shown herein is the so-called "two wire system". With several commercial types of damper controllers and thermostats, a "three wire system" is used. Such controllers and thermostats may be used as a part of the apparatus for carrying out the invention and the same may be connected by wiring analogous to that shown herein. In another form of the invention, the fan 21 may be so placed as to draw the heated air from the furnace instead of forcing cold air thereto. In either case the rate of cold air supply is controlled by the operation of the fan.

The invention claimed is:

1. In a furnace control, the combination of apparatus for controlling the rate of combustion and the rate of supply of a heat-conducting medium, thermostatic apparatus responsive to furnace temperature, and connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to check combustion while supplying said medium when furnace temperature exceeds a predetermined degree.

2. In a furnace control, the combination of apparatus for controlling the rate of combustion and the rate of supply of a heat-conducting medium, thermostatic apparatus responsive to furnace temperature, and connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to accelerate combustion and check the supply of said medium when furnace temperature is below a predetermined degree.

3. In a furnace control, the combination of apparatus for controlling the rate of combustion and the rate of supply of a heat-conducting medium, thermostatic apparatus responsive to furnace temperature, and connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to check combustion while supplying said medium when furnace temperature exceeds a predetermined degree and to accelerate combustion and check the supply of said medium when furnace temperature is below a second predetermined degree lower than said first.

4. In a furnace control, the combination of apparatus for controlling the rate of combustion and the rate of supply of a heat-conducting medium, thermostatic apparatus responsive to furnace temperature, connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to check combustion while supplying said medium when furnace temperature exceeds a predetermined degree, other thermostatic apparatus responsive to the temperature of the object to be heated, and connections between said control apparatus and said last-mentioned thermostatic apparatus by means of which said control apparatus operates to check both combustion and the supply of said medium when said object is above a predetermined temperature irrespective of the furnace temperature.

5. In a furnace control, the combination of apparatus for controlling the rate of combustion and the rate of supply of a heat-conducting medium, thermostatic apparatus responsive to furnace temperature, connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to accelerate combustion and check the supply of said medium

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when furnace temperature is below a predetermined degree, other thermostatic apparatus responsive to the temperature of the object to be heated, and connections between said control apparatus and said last-mentioned thermostatic apparatus by means of which said control apparatus operates to check both combustion and the supply of said medium when said object is above a predetermined temperature irrespective of the furnace temperature.

6. In a furnace control, the combination of an electrically-operated combustion control apparatus adapted to accelerate combustion when supplied with electric power and to check combustion when not so supplied, a motor-driven fan for controlling the supply of air to be heated, a source of electric power, electric circuits for connecting said power source to said control apparatus and the motor of said fan, and thermostatic apparatus interposed in said circuits, responsive to furnace temperature and adapted to interrupt the circuit to said combustion control apparatus while completing the circuit to the motor of said fan when furnace temperature is above a predetermined degree.

7. In a furnace control, the combination of an electrically-operated combustion control apparatus adapted to accelerate combustion when supplied with electric power and to check combustion when not so supplied, a motor-driven fan for controlling the supply of air to be heated, a source of electric power, electric circuits for connecting said power source to said control apparatus and the motor of said fan, and thermostatic apparatus interposed in said circuits, responsive to furnace temperature and adapted to interrupt the circuit to the motor of said fan while completing the circuit to said combustion control apparatus when furnace temperature is below a predetermined degree.

8. In a furnace control, the combination of an electrically-operated combustion control apparatus adapted to accelerate combustion when supplied with electric power and to check combustion when not so supplied, a motor-driven fan for controlling the supply of air to be heated, a source of electric power, electric circuits for connecting said power source to said control apparatus and the motor of said fan, and thermostatic apparatus interposed in said circuits, responsive to furnace temperature and adapted to interrupt the circuit to said combustion control apparatus while completing the circuit to the motor of said fan when furnace temperature is above a predetermined degree, and to interrupt the circuit to the motor of said fan while completing the circuit to said combustion control apparatus when furnace temperature is below a second predetermined degree lower than said first.

9. In a furnace control, the combination of an electrically-operated combustion control apparatus adapted to accelerate combustion when supplied with electric power and to check combustion when not so supplied, a motor-driven fan for controlling the supply of air to be heated, a source of electric power, electric circuits for connecting said power source to said control apparatus and the motor of said fan, thermostatic apparatus interposed in said circuits, responsive to furnace temperature and adapted to interrupt the circuit to said combustion control apparatus while completing the circuit to the motor of said fan when furnace temperature is above a predetermined degree, and other thermostatic apparatus interposed in said circuits in series connection with said first-mentioned thermostatic apparatus, responsive to the temperature of the space to be heated and adapted to interrupt the circuits to both said combustion control apparatus and to the motor of said fan when said last-mentioned temperature is above a predetermined value.

10. In a furnace control, the combination of an electrically-operated combustion control apparatus adapted to accelerate combustion when supplied with electric power and to check combustion when not so supplied, a motor-driven fan for controlling the supply of air to be heated, a source of electric power, electric circuits for connecting said power source to said control apparatus and the motor of said fan, thermostatic apparatus interposed in said circuits, responsive to furnace temperature and adapted to interrupt the circuit to the motor of said fan while completing the circuit to said combustion control apparatus when furnace temperature is below a predetermined degree, and other thermostatic apparatus interposed in said circuits in series connection with said first-mentioned thermostatic apparatus, responsive to the temperature of the space to be heated and adapted to interrupt the circuits to both said combustion control apparatus and to the motor of said fan when said last-mentioned temperature is above a predetermined value.

In witness whereof, I have hereunto affixed my signature.

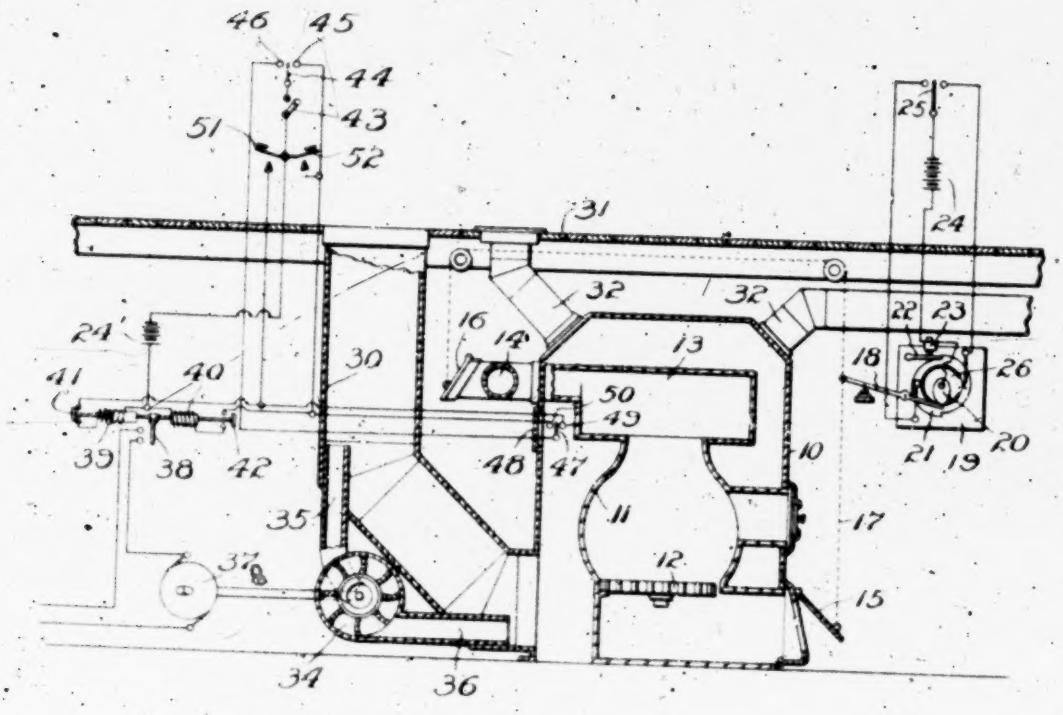
EDWARD E. FREEMAN.

MERCOID EXHIBIT XXX 8

Jan. 23, 1923.

Re. 15,531

E. F. EDGECOMBE, JR.
CIRCULATION CONTROL SYSTEM.
ORIGINAL FILED MAY 11, 1915



INVENTOR
Edward F. Edgecombe, Jr.
BY
Arthur M. Hood
ATTORNEY

Reissued Jan. 23, 1923. Re. 15,531

UNITED STATES PATENT OFFICE.

EDWARD F. EDGECOMBE, JR., OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE HONEYWELL HEATING SPECIALTIES COMPANY, OF WABASH, INDIANA, A CORPORATION OF INDIANA.

CIRCULATION-CONTROL SYSTEM.

Original No. 1,138,854, dated May 11, 1915, Serial No. 739,668, filed January 2, 1913. Application for reissue filed July 14, 1922. Serial No. 575,067.

To all whom it may concern:

Be it known that I, EDWARD F. EDGECOMBE, Jr., a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Circulation-Control System, of which the following is a specification.

In hot air heating systems the circulation of the air is frequently poor, in spite of the circulating tendency of the heating source, such as a furnace. This poor circulation may be due, for instance, to the direction of the wind. When the circulation of the heating air is poor, the temperature of the house or other space to be heated becomes uneven in different parts and cannot be maintained as high as desired, even though a good furnace fire is maintained. This results in a waste of fuel and a rapid deterioration of the furnace, not to mention the physical and psychical effect on the inhabitants of the house.

It is the primary object of my invention to improve this circulation when it is poor; and at the same time and thereby to maintain the temperature more nearly even and at the desired point; to economize in fuel; to lengthen the life of the furnace; and to reduce the care required for the operation of the furnace. In attaining these results, I provide means for producing a forced circulation of the heating air, and control such circulating means by the temperature of the furnace; by the temperature at a control point, as in the living room of a house; and, also, for the best results, I combine the circulation control device with means for automatically controlling the furnace drafts.

The single figure of the accompanying drawing illustrates semi-diagrammatically a furnace heating system embodying my invention.

In the arrangement shown there is a furnace 10 of any desired type, usually having a fire pot 11 above a grate 12, the products of combustion in the fire pot 11 passing through a radiator casing 13 and a smoke pipe 14 to a suitable chimney. Draft control doors 15 and 16, communicating with the space below the grate 12 and with the smoke pipe 14 respectively, are connected by a chain 17 to the operating lever 18 of any suitable automatic draft control system. In the case illustrated, this system comprises a spring motor 19, the shaft of which carries a cam 20 which rocks the lever 18 to open and close the furnace draft, the spring motor being provided with a ratchet wheel 21 which cooperates with a pawl 22 to prevent movement of the spring motor save when such pawl is lifted by an electro-magnet 23, which is energized from a battery 24 and controlled by the usual thermostat 25 in the living room or at some other control point and by a commutator 26 on the shaft of the motor 19 to permit a movement of such shaft to put on or shut off the furnace draft when the temperature at the control point reaches the predetermined minimum or maximum. Various forms of damper control schemes may be used, or in some instances none may be used, though the circulation control system hereinafter described works more advantageously when combined with a draft control system.

The air for heating is supplied to the furnace through a pipe 30, which may lead from any desired point, such as the outside atmosphere or from above the floor 31, the furnace ordinarily being located in the cellar. The air from the pipe 30 enters the furnace casing near the bottom, and passes upwardly around the fire pot 11 and radiator casing 13 to the top of the furnace, and thence out through the flues 32 to the rooms or other spaces to be heated. Under many conditions, the circulation of the air is maintained by the heat within the fire pot 11 and radiator casing 13. It is to assist this circulation when it is poor that I have provided my circulation control system. A blower 34, here a centrifugal fan, is suitably pneumatically connected to do this, in the case shown having its inlet pipe 35 opening upwardly into the pipe 30 and the discharge pipe 36 discharging into the furnace so that when the fan is operating it not only blows air out through the pipe 36 but by an injector action increases the flow through the pipe 30 in a shunt path to the blower. The blower 34 is driven by an electric motor 37, of any suitable type though here shown as a direct current motor. The circuit of the motor 37 is controlled by an electro-magnetically operated switch 38 having closing and opening coils 39 and 40, the circuits of

which are broken automatically by auxiliary switch contacts 41 and 42 when such coils have respectively operated the switch. A battery 24' which for convenience of illustration is shown as separate from the battery 24, though such is not necessarily the case, has one terminal connected in common to the coils 39 and 40, the other terminal being connected through a switch 43 to the movable member or tongue 44 of a thermostat located at the desired control point, such as the living room of the house. This thermostat has the usual "hot" and "cold" contact buttons 45 and 46. The "hot" button is connected through the auxiliary switch 42 to the opening coil 40 of the switch 38. The "cold" button 46 is connected to the movable member or tongue 47 of a thermostat located so that it is responsive directly to the heat of the furnace, conveniently by being mounted on a removable plate 48 so that it is within the furnace casing and in close proximity to the radiator casing 13. This thermostat also has "hot" and "cold" buttons 49 and 50, which are connected through the switches 41 and 42 to the closing and opening coils 39 and 40 respectively of the switch 38. The movable thermostat members 25 and 44 are here shown as separate members, for simplicity of illustration.

In operation, the thermostat 44 is preferably adjusted so that it engages its "hot" and "cold" contact buttons 45 and 46 at temperatures respectively very slightly above temperatures at which the thermostat 25 engages its "hot" and "cold" contact buttons, though other adjustments may be made. When the temperature in the house living room or other control point drops below the predetermined normal value, the thermostat 44 engages its "cold" contact button 46, and if the furnace is hot enough so that its thermostat 47 engages its "hot" contact button 49 at this time, this completes the circuit through the auxiliary switch 41 of the closing coil 39 of the switch 38 and starts the blower in operation to produce a forced circulation of the heating air. However, if the furnace is not sufficiently hot to make the thermostat 47 engage its "hot" contact button, the switch 38 is not closed, and the temperature in the living room may continue to fall until the thermostat 25 closes the circuit for the magnet 23 to raise the pawl 22 to allow the spring motor 19 to rock the arm 18 to open the furnace draft. If the fireman has been faithful, this opening of the drafts produces an increase in the furnace temperature, which, unless conditions are adverse, produces the desired circulation of the air through the pipe 30 and flue 32 to raise the room temperature. However, if conditions are adverse, the circulation thus produced by the increased heat of the furnace is not sufficient, and because of the lack of circulation the temperature of the furnace rises until the thermostat 47 engages its "hot" button 49. The thermostat 44 still being in engagement with its "cold" contact button 46, this closes the circuit through the auxiliary switch 41, for the closing coil 39 of the switch 38, thereby closing said switch to complete the motor circuit and opening the auxiliary switch 41 to break the circuit of the closing coil 39 after it has done its work. The motor 37 now drives the blower 34 to produce a forced circulation through the pipe 30, the furnace, and the flues 32, thereby enabling the full effect of the increased heat due to the opening of the furnace draft to be obtained. The improved circulation thus produced raises the temperature at the control point and elsewhere throughout the house. When the furnace is cooled sufficiently by this circulation to make the thermostat 47 engage its "cold" contact button 50, the thermostat 44 still being in engagement with its "cold" contact button 46; or when the temperature of the living room or other control point rises sufficiently to make the thermostat 44 engage its "hot" contact button 45; the circuit of the opening coil 40 is closed, through the auxiliary switch 42, thereby causing the opening of the switches 38 and 42 and the breaking of the circuits of both the motor 37 and the opening coil 40. When the temperature in the room reaches the upper temperature limit of the thermostat 25, the latter closes the circuit of the magnet 23 to raise the pawl 22 and allow the motor 19 to cooperate to close the door 15 and open the door 16, thus closing the furnace draft, the commutator 26 at the same time immediately breaking the circuit of the magnet 23.

By maintaining the circulation as above described, a much more even temperature is maintained throughout the house; the lifetime of the furnace is lengthened because of the prevention of the excessive heat which is otherwise produced therein; fuel is saved; and the time lag in the draft control system, due to the slowness with which the draft control apparatus responds to changes in the heating effect of the furnace is much reduced.

It will be readily understood that if thermostat 44 be adjusted so that it will remain in contact with the "cold" button 46 even when the room temperatures are as high as may be desired and as may be obtainable with any fire in the furnace, the thermostat 47 will then serve (switch 43 being closed) to automatically control the circulation fan, the fan starting and continuing to run only when the temperature of the furnace is high enough to justify forced circulation, and stopping, and remaining stopped, when, and so long as, the tempera-

ture of the furnace is too low. With this limited portion of the apparatus it is apparent that forced circulation will be avoided whenever the furnace temperatures are too low, and will be established, to assist in preventing the attainment of too high temperatures in the furnace itself, whenever the furnace temperatures are high enough.

The circulation control system may also be used for producing artificial ventilation in summer time. To this end, two push buttons 51 and 52 are provided at some convenient location, as near the thermostat 44, and are connected in common to the wire leading from the battery 24' to the switch 43. The other terminals of these two push buttons are connected, through the auxiliary switches 41 and 42, to the closing and opening coils respectively, of the switch 38. The switch 43 being open, the motor 37 and blower 34 may be started and stopped as desired by manipulating the push buttons 51 and 52. These push buttons also provide a convenient means whereby when the furnace is going the forced circulation of the heating air may be controlled at will without the aid of the thermostat 44, for, with the switch 43 open, the device is rendered wholly non-automatic and the fan may be started by pressing the push button 51 and stopped by pressing the push button 52.

I claim as my invention:

1. In combination, a hot air heating plant, means for producing a forced circulation for said plant, temperature-responsive means for controlling said circulation producing means, and means responsive to the condition of the heating plant for controlling the effect produced by said temperature-responsive means.

2. In combination, a hot air furnace, a power-operated blower for assisting the circulation of heating air through said furnace, thermostatic means for controlling said blower, and means responsive to the condition of the furnace for controlling the effect produced by said thermostatic means.

3. In combination, a hot air furnace, power-operated means for producing a forced circulation of heating air through said furnace, a thermostat responsive to the temperature at a control point, and a second thermostat responsive to the temperature of the furnace, said two thermostats cooperating to control said circulation-producing means.

4. In combination, a hot air furnace, power-operated means for producing a forced circulation of heating air through said furnace, a thermostat responsive to the temperature at a control point, a second thermostat responsive to the temperature of the furnace, and an electro-magnetically operated device controlling the operation of said circulation-producing means and controlled by the joint action of said two thermostats.

5. In combination, a hot air furnace, power-operated means for producing a forced circulation of heating air therethrough, a thermostat located at a desired control point and having "hot" and "cold" contact buttons, a second thermostat responsive to the temperature of the furnace and also having "hot" and "cold" contact buttons, an electro-magnetically operated device controlling the operation of said circulation-producing means, and connections between said two thermostats and said electro-magnetically operated device whereby the latter is actuated to start the circulation-producing means in operation when the first thermostat engages its "cold" contact button and the second thermostat engages its "hot" contact button, and to stop the operation of the circulation-producing means when both thermostats engage their "cold" contact buttons or the first thermostat engages its "hot" contact button.

6. In combination, a hot air furnace, means for producing a forced circulation of heating air therethrough, temperature-responsive means for controlling said circulation-producing means, and temperature-responsive means for controlling the furnace draft.

7. In combination, a hot air furnace, means for producing a forced circulation of heating air therethrough, means controlled by the temperatures at a desired control point and at the furnace for controlling said circulation-producing means, and means controlled by the temperature at a desired control point for controlling the furnace draft.

8. In combination, a hot air furnace, means for producing a forced circulation of heating air therethrough, and means independently controlled by the temperatures at a desired control point and at the furnace for controlling said circulation-producing means.

9. In combination, a hot air heating plant, means for producing a forced circulation of heating air therethrough, temperature-responsive means for controlling said circulation-producing means, and temperature-responsive means for controlling the heat in said heating plant.

10. In combination, a hot air furnace, means of producing a forced circulation of heating air therethrough, and temperature-responsive means for controlling said circulation-producing means and the furnace draft.

11. In combination, a hot air furnace, means for producing a forced circulation of heating air therethrough, and means controlled by the temperature at a desired con-

trol point for controlling said circulation-producing means and the furnace draft and by the temperature at the furnace for controlling said circulation-producing means.

12. In combination, a hot air heating furnace, means for producing a forced circulation of heating air therethrough, and temperature responsive means, responsive to immediate furnace temperatures, for controlling said circulation-producing means, to automatically start said circulation means upon attainment of a desired furnace temperature and to prevent such movement when the furnace temperature is too low.

13. In combination, a hot air furnace, power-operated means for producing a forced circulation of heating air through said furnace, a thermostat responsive to the temperature of the space to be heated by said furnace, a second thermostat responsive to the temperature of the said furnace, and means through which said two thermostats cooperate to control said circulation-producing means.

14. In combination, a hot air furnace, power-operated means for producing a forced circulation of heating air through said furnace, a thermostat responsive to the temperature of the space to be heated by said furnace, a second thermostat responsive to the temperature of the furnace, and an electro-magnetically operated device controlling the operation of said circulation-producing means and controlled by the inter-dependent action of said two thermostats.

15. In combination, a hot air furnace, means for producing a forced circulation of heating air therethrough, means responsive to the temperature of the space to be heated by said furnace for controlling said circulation-producing means, and means responsive to the temperature of the space to be heated by said furnace for controlling the furnace draft.

16. In combination, a hot air furnace, means for producing a forced circulation of heating air therethrough and means responsive to the temperature of the space to be heated by said furnace for controlling both said circulation-producing means and the furnace draft.

17. In combination, a hot air heating plant, means for producing a forced circulation of heating air therethrough, means responsive to the temperature of the space to be heated by said plant for controlling said circulation-producing means, and means responsive to the temperature of the space to be heated by said plant for controlling the heat in such heating plant.

18. In combination, a hot air heating plant, means for producing a forced circulation of heating air therethrough, and means responsive to the temperature of the space to be heated by said furnace for controlling both said circulation-producing means and the heat in said heating plant.

19. In combination, a hot air furnace, means for producing a forced circulation of heating air therethrough, and means controlled by the temperature of the space to be heated by said furnace for controlling said circulation-producing means and the furnace draft and by the temperature at the furnace for controlling said circulation-producing means.

20. The combination with a hot air furnace, of a forced circulation means for the heating air including a motor, and means for controlling the movement of said motor, comprising a thermostat arranged within the immediate temperature influence of the furnace.

21. The combination with a hot air furnace of a circulation fan arranged to affect the flow of air through the heating spaces of said furnace, an electric motor for driving said fan, and a thermostat arranged within the immediate temperature influence of the furnace for controlling said fan motor to limit its movement to periods during which the furnace is at or above the desired temperature.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 6th day of July, A. D. one thousand nine hundred and twenty-two.

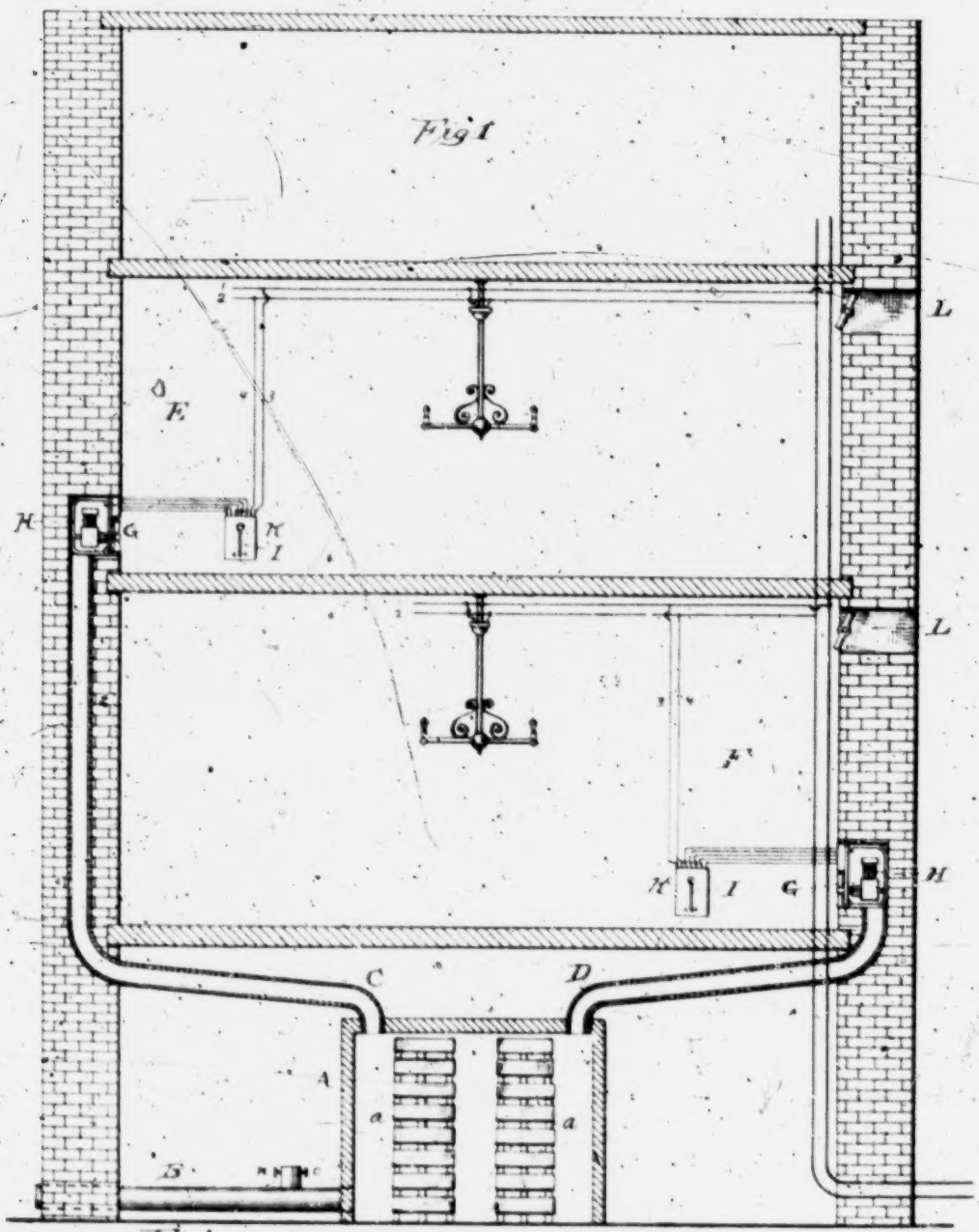
EDWARD F. EDGECOMBE, JR.

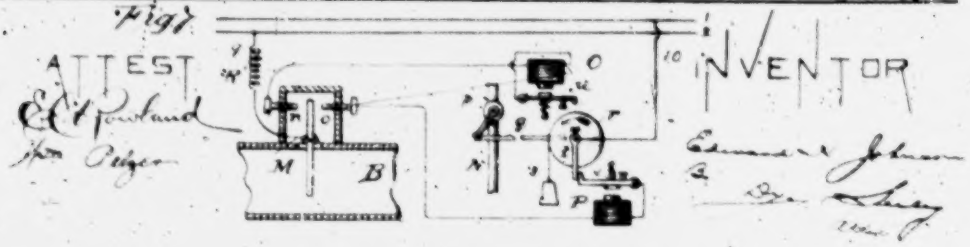
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E. H. JOHNSON.

ELECTRICAL APPARATUS FOR HEATING AND COOLING BUILDINGS.

No. 360,223. Patented Mar. 29, 1887.





ATTEST

INVENTOR

No Model. 2 Sheets—Sheet 2

E. H. JOHNSON.

ELECTRICAL APPARATUS FOR HEATING AND COOLING BUILDINGS.

No. 360,223. Patented Mar. 29, 1887.

Fig 2

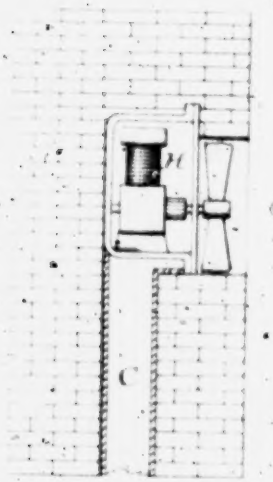


Fig 3

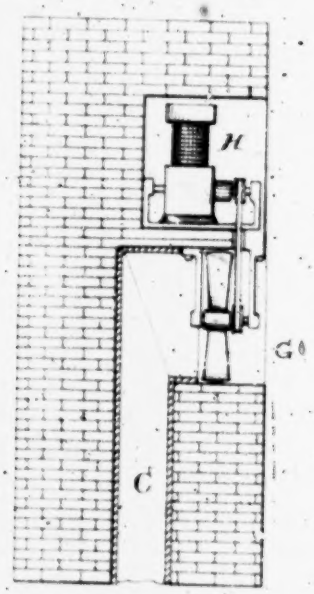


Fig 4

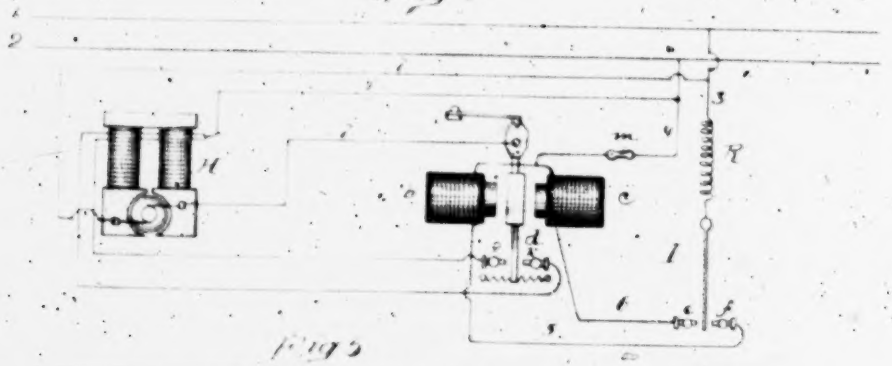


Fig 5

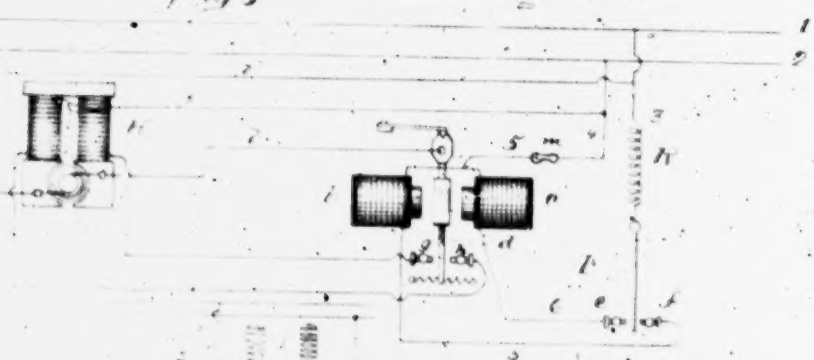


Fig 6



ATTEST

INVENTOR

UNITED STATES PATENT OFFICE.

EDWARD H. JOHNSON, OF NEW YORK, N. Y.

ELECTRICAL APPARATUS FOR HEATING AND COOLING BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 360,223, dated March 29, 1887.

Application filed October 8, 1886. Serial No. 215,631. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. JOHNSON, of New York city, in the county and State of New York, have invented a certain new and useful Improvement in Apparatus for Heating and Cooling Buildings, of which the following is a specification.

The object I have in view is to produce a simple, efficient, and economical apparatus for automatically maintaining the desired temperature in the rooms of a building. The apparatus is designed to be controlled and operated electrically. It responds independently to changes in temperature in the separate rooms, floors, or other divisions of a building, and it produces a complete circulation of the heated or cooled air from one part of the building to another, so that an excess of heat or cold in one part will be utilized in other parts of the building where the opposite condition exists.

It is also designed to be economical in the use of power, to prevent waste when there is an excess of heat or cold.

In carrying out the invention I use the ordinary piping extending from the several rooms of a building to a heating or cooling chamber in the cellar, which chamber is in turn connected by a pipe with the atmosphere outside of the building for supplying fresh air to the heating or cooling chamber, from whence it is delivered to the rooms of the building. At the ends of the air-pipes where they open into the rooms are located revolving fans or blowers capable of movement in opposite directions, so that air may be caused to circulate from the pipes into the rooms or from the rooms into the pipes. Each of these fans is revolved by an electric motor, and the motor is controlled by a thermostat located in the same room.

The rooms may have ventilators connecting with the external atmosphere, or the openings such as exist around windows and doors may be depended upon to supply external air to a room when its fan is drawing air from the room and forcing it down the air-pipes. The thermostat located in the room is adjusted to maintain the temperature within certain limits. Within these limits the motor is at rest; but when either limit is reached the thermostat closes a circuit to intermediate electric apparatus, which closes the motor-circuit and causes the motor to revolve. When the thermostat assumes a central position again, the motor-circuit is broken and the motor stopped. The intermediate electric apparatus reverses the motor, as well as opens and closes its circuit, so that the deflection of the thermostat in opposite directions produces opposite movements of the motor and the fan driven by it. If the building is lighted by electricity, the electric current for operating the motors and their controlling devices may be taken from the electric-lighting circuit at a point beyond the electric light switches, if any are used, so that the current will be supplied at all times. The air drawn from a room and forced into the air-pipe is returned to the heating or cooling chamber in the cellar, and after being further heated or cooled passes from thence into pipes leading to other rooms of the house, so that the heat or cold already stored up in the air will be utilized. If more air is being forced back into the heating or cooling chamber than is passing therefrom into the rooms of the house, the surplus will be forced out of the fresh-air duct into the external atmosphere.

A simple hand switch may be provided for each motor to prevent its action when desired.

Advantage is taken of the fact that the air travels in both directions in the fresh-air pipe to provide the apparatus with means for automatically controlling the supply of heat or cold to the radiators in the heating or cooling chamber, so as to prevent waste of power. A swinging vane is introduced into the fresh-air pipe, and by its movements back and forth controls electric circuits, which include devices for controlling the supply of heat or cold to the radiators.

In the accompanying drawings, forming a part hereof, Figure 1 is a sectional elevation of part of a house showing my apparatus applied thereto; Fig. 2, a detail sectional view showing on a larger scale the location of a fan and motor at the end of an air-pipe; Fig. 3, a similar view illustrating the motor separated from the fan and placed above the mouth of the air-pipe. Figs. 4, 5, and 6 are views, principally in diagram, showing the connections of the thermostat, the motor, and the intermediate apparatus; and Fig. 7, a view, partly in diagram, illustrating the devices for controlling the supply of heat or cold to the heating or cooling chamber.

A is a heating or cooling chamber or box

located in the cellar or basement of the building. It is shown as provided with radiators *a*, through which a heating medium—such as steam—or a cooling medium—such as water—may be passed; or this chamber A may be the air-chamber of a hot-air furnace. A fresh air pipe or duct, B, leads from the chamber A to a point outside the building. From the chamber A also leads the air pipes or ducts C D, leading to the rooms E F. At the open upper end of each room-pipe is placed a revolving fan, G, which is driven by an electric motor, H, capable of revolving in opposite directions.

The motor may carry the fan directly on its shaft and be located with the fan in the open end of the pipe, as shown in Figs. 1 and 2, or the motor may be in a box above, below, or to one side of the air pipe and be connected with the fan by an endless cord, as shown in Fig. 3.

I is the thermostat, and K is the intermediate apparatus, of which there is one of each for each motor. The intermediate apparatus in Fig. 1 is inclosed in the boxes upon which the thermostats are mounted, and in or upon which the electric connections between the thermostat and the intermediate apparatus are made. In Figs. 4 to 6 such intermediate apparatus is disclosed. It is composed of two electro magnets, *b c*, between which is a pivoted armature lever, *d*, held normally in a central position. The thermostat is located in a circuit, 3 4, from a suitable source of electrical energy. This is preferably the electric lighting circuit 1 2, a resistance, R, being used to reduce the flow of current. At the contacts *e f* of the thermostat the circuit 1 2 is divided into branches 5 and 6, the branch 5 including the magnet *b*, while the branch 6 includes the magnet *c*. In Figs. 4 and 5 the armature lever *d* plays between simple contacts *g h*. From the circuit 3 4, or directly from 1 2, is taken the motor circuit 7 8. Conductor 7 extends to the motor armature and from thence to the pivot of the lever *d*. At the contacts *g h* this circuit is divided, the branches including oppositely wound sections of the motor field-magnet, as in Fig. 4, or one branch including one leg of the field magnet and the other branch the other leg, as in Fig. 5. The conductor 8 extends from the joined ends of the oppositely wound field magnet sections, Fig. 4, or from the field wire when it passes from one leg to the other of the field magnet, Fig. 5.

In Fig. 6 the field magnet coils of the motor are shown at *i* and the motor armature at *l*. The lever *d* is shown as working a two-arm reversing device, *l*, reversing the connections of the field magnet coils, and also serving to make and break the entire motor circuit. In all three instances of intermediate apparatus the motor armature and field magnet are located in series in the same circuit, so as to get the advantage of their combined resistance, and the motor is reversed by reversing the polarity of its field magnet. The reversing apparatus also serves to open the motor-circuit. The peculiar intermediate apparatus shown in Figs. 4 and 5 possesses the advantage of only requiring the use of simple contact points; but it has the disadvantage as compared with the apparatus of Fig. 6 of not bringing all the wires of the field magnet into circuit at one time.

When a thermostat closes circuit at *e* or *f*, the magnet *b* or *c* is brought into circuit, and closes the motor circuit with such a polarity to the field-magnet that the motor will revolve in one or the other direction, according to whether the thermostat closes on *e* or on *f*. The motor will revolve the fan, which will deliver heated or cooled air to the room or draw air from the room, the loss in the latter case being supplied through a ventilator, L, or through the openings around windows and doors. This operation will continue until the temperature is changed to the necessary extent, when the thermostat will break the circuit to the intermediate apparatus, and this, in turn, will break the motor circuit. The air drawn from one room will be driven back into the heating or cooling chamber, and from thence distributed to other rooms or forced out of the fresh air duct.

A simple hand switch, *m*, Figs. 4, 5, and 6, is included in the thermostat circuit 3 4, so that when desired the apparatus may be made inoperative by breaking the thermostat circuit. To control the supply of heat or cold to the radiators *a* in the chamber A and prevent waste of power, advantage is taken of the fact that when there is an excess in the supply of heat or cold to the radiators air will be forced out of the fresh air pipe B, and under the opposite conditions air will be drawn in through said pipe. A swinging vane, M, is introduced into the fresh air pipe B, Fig. 7. When this vane hangs vertically, it stands centrally between contact points *n o*, and out of contact with such points. The pipe N supplies the heating or cooling medium to the radiators *a*, and is provided with a cock, *p*, which is opened and closed by a pitman-bar, *q*, extending to a wheel, *r*, which wheel is turned by a clock-train, represented by the weight *s*; or any other form of motor can be employed for this purpose. An arm, *t*, on the same shaft as the wheel *r*, is intercepted by the armature levers *u v* of two electro magnets, O P, such armature levers being located at diametrically opposite points, so as to stop the wheel at each half-revolution.

From the electric lighting circuit 1 2 is taken the circuit 9 10, which passes to the pivot of vane M and extends in two branches from the contact screws *n o* to the magnets O P, from thence to the armature-levers *u v* of such magnets, and then by a common return from the shaft of wheel *r* to the other side of the circuit 1 2. A resistance, R', may be included in the circuit 9 10, if desired. The cock *p* is shown as open. When the vane M is swung by an

outflowing current of air, it makes contact at *o* and closes circuit to the magnet P, which releases the wheel *r*, and this wheel turns until the arm *t* is intercepted by the lever *u* of the magnet O. This half-revolution of the wheel draws the pitman to the otherside of the wheel and closes the cock, cutting off the supply of the heating or cooling medium to the radiators *a*. When the vane swings in the other direction, it will make contact at *n* and close circuit to the magnet O, when the wheel *r* will be again released, opening the cock *p*, and the parts will again assume the position shown. By extending the circuits of the magnets O P through their armature-levers the circuit to each magnet can be completed only when the revolving arm *t* is in contact with its armature-levers. Hence, each magnet has its circuit broken as soon as it releases the arm *t*, and a waste of current is prevented. The vane M can be made as sensitive as desired by constructing the part above the pivot of nearly the same weight as the part below the pivot, and by properly proportioning the relative weight of these parts the precise action desired can be secured; or a balanced revolving vane could be used, if desired.

What I claim is—

1. The combination, with an air pipe, duct, or flue delivering air to a room in a building, of a fan or blower located within said pipe, an electric motor operating the same, and a thermostat controlling such motor; substantially as set forth.

2. The combination, with an air pipe, duct, or flue delivering air to a room in a building, of a fan or blower located within said pipe, an electric motor operating the same, an intermediate electric apparatus directly controlling the motor circuit, and a thermostat opening and closing circuit to such intermediate apparatus, substantially as set forth.

3. The combination, with an air pipe, duct, or flue delivering hot or cold air to a room, of a fan or blower located within such pipe and capable of reverse movements, so as to force air into or draw it from the room, and devices controlled by changes in temperature in the room and acting to work such fan or blower in opposite directions, substantially as set forth.

4. The combination, with two or more air pipes, ducts, or flues extending to different rooms of a building, and a common hot or cold air chamber from which such pipes extend, of a fan or blower located within each of such pipes and capable of reverse movements, so as to force air into or draw it from the room, and devices for each fan controlled by changes in temperature and acting to work such fan or blower in opposite directions, substantially as set forth.

5. The combination, with an air pipe, duct, or flue delivering hot or cold air to a room, of a fan or blower within such pipe capable of movement in opposite directions, an electric motor driving such fan, an intermediate circuit controlling and reversing apparatus for such motor, and a thermostat controlling the circuit to such intermediate apparatus, substantially as set forth.

6. The combination, with the temperature-maintaining fan, of the electric motor driving the same, and having its armature and field-magnet coils in series, an intermediate electric apparatus acting to make and break the motor-circuit and to reverse the connections of its field-magnet coils, and the thermostat controlling the circuit of the intermediate apparatus, substantially as set forth.

7. The combination, with the temperature-maintaining fan, the electric motor, the intermediate apparatus, and the thermostat, of an electric lighting circuit and connections therefrom to such devices, substantially as set forth.

8. The combination, with the temperature-maintaining fan, the electric motor, the intermediate apparatus, the thermostat, and electric connections for supplying such devices with current for automatic operation, of a hand switch for rendering said devices inoperative, substantially as set forth.

9. The combination, with a heating or cooling chamber, air pipes leading therefrom to the rooms of the building, and a fresh-air pipe leading to such chamber and having a vane moved by the air currents in such pipe, of means controlled by the air currents in such fresh-air pipe and acting to control the supply of the heating or cooling medium to such chamber, substantially as set forth.

10. The combination, with a heating or cooling chamber, air pipes leading therefrom to the rooms of the building, thermostatically-controlled motors operating fans which act to force air into or draw it from the rooms, and a fresh air pipe leading to such chamber and having a vane moved by the air currents in such pipe, of means controlled by the air currents in such fresh-air pipe and acting to control the supply of the heating or cooling medium to such chamber, substantially as set forth.

11. The combination, with the heating or cooling chamber and the fresh air pipe, of the moving vane in such pipe, a valve controlling the supply of the heating or cooling medium to such chamber, and electric connections controlled by the vane for operating such valve, substantially as set forth.

12. The combination, with the fresh air pipe, the vane therein, and the valve-operating wheel revolved by a motor, of the revolving stop-arm, and the two electro-magnets having their circuits extending through their armatures and said revolving stop-arm, whereby the circuit of each magnet will be opened after releasing such stop-arm, substantially as set forth.

This specification signed and witnessed this 6th day of October, 1886.

EDWD. H. JOHNSON.

Witnesses:
RICHD. N. DYER.
WM. PELZER.

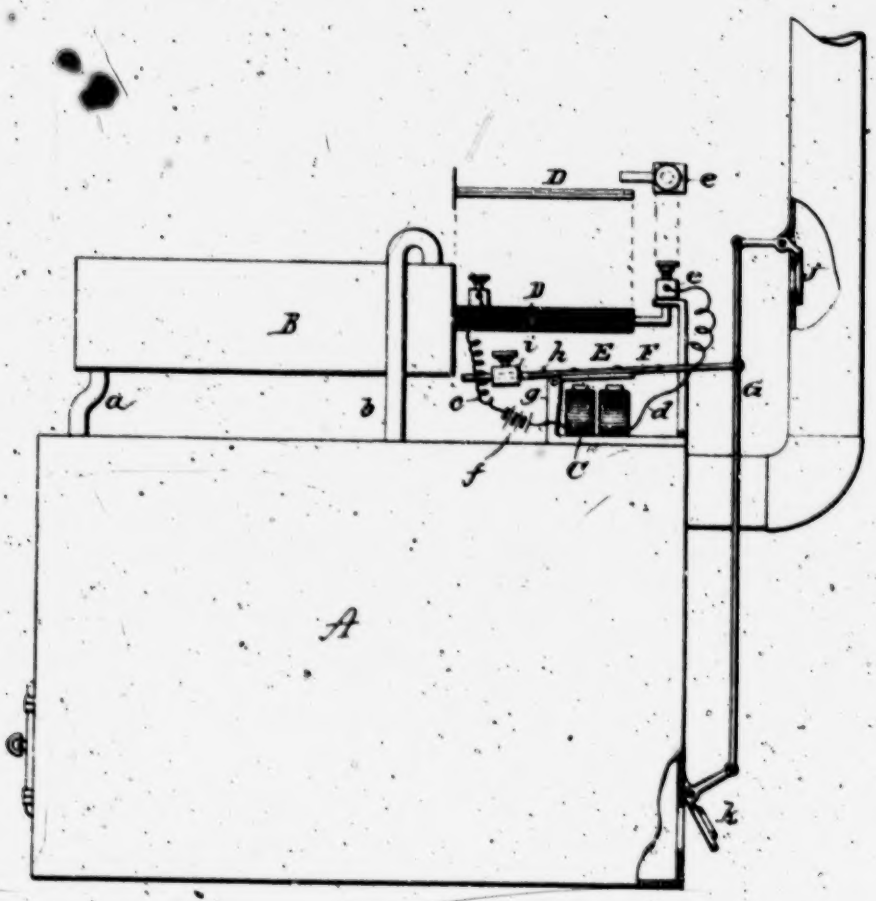
MERCOID EXHIBIT XXX-2

1120 (No Model.)

W. H. KILBOURN.

TEMPERATURE REGULATOR.

No. 479,761. Patented July 26, 1892.



Witnesses
E. Mottinghams
G. F. Downing

Inventor
W. H. Kilbourn
By Leggett and Leggett
Attorneys

UNITED STATES PATENT OFFICE.

WASHINGTON H. KILBOURN, OF GREENFIELD, MASSACHUSETTS, ASSIGNOR TO ALBERT J. SMART AND J. E. HUBBARD, OF SAME PLACE.

TEMPERATURE-REGULATOR.

1121

SPECIFICATION forming part of Letters Patent No. 479,761, dated July 26, 1892.

Application filed May 13, 1891. Renewed June 30, 1892. Serial No. 438,635. (No model.)

To all whom it may concern:

Be it known that I, WASHINGTON H. KILBOURN, a resident of Greenfield, in the county of Franklin and State of Massachusetts, have invented certain new and useful Improvements in Temperature-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in devices for automatically regulating the temperature, and more particularly to devices for regulating the heat produced by hot-water heaters, the object of the invention being to provide means whereby when a tank or radiator containing hot water becomes too hot the draft to the furnace and the damper in the flue leading from said furnace may be automatically and simultaneously operated to close the former and open the latter.

A further object is to produce a system of devices and electric circuits for the purpose stated which shall be simple in construction and effectual in the performance of their functions.

With these objects in view the invention consists in a thermostat-bar connected with a hot-water radiator, electrical devices connected with said thermostat, and rods connected with said electrical devices for operating valves or dampers.

It further consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawing is represented a boiler-furnace having a water-tank or radiator connected thereto and my improved devices for regulating the temperature of the tank or radiator.

A represents a steam-boiler furnace of any preferred construction, and B a water-tank or radiator connected thereto by means of pipes *a b*, whereby a circulation of water will be kept up between the boiler of the furnace and the water-tank B. Located in the tank B and projecting from the end thereof is a thermostat-bar D of any preferred form of construction, to which one end of a conducting-wire *c* is attached, the other end of said wire being connected to one end of the helix of an electro-magnet C. The other end of the helix of the electro-magnet C is connected by a wire *d* with a contact-post *e*, located in proximity to the free end of the thermostat-bar D. A battery *f* may be included in the circuit of the wire *c*, or, if desired, the battery may be included in the circuit of the wire *d*. Pivotally supported over the poles of the magnet C by means of a suitable upright *g* is an armature E for said magnet, and extending across said armature and secured to it is a rod or bar F, the rearward extension *h* of the rod being provided with a weight *i*, whereby to counterbalance the armature. The rod F extends forwardly from the armature and is pivotally connected at its forward end to a vertical rod or bar G. The upper end of the vertical rod or bar G is connected to a normally-closed valve or damper in the pipe or stack *j* of the furnace, while the lower end of said rod or bar G is connected to a normally-open door or damper *k* in the furnace, said door or damper being so located as to control the draft to the fire in the furnace. It is evident that the water tank or radiator may be located at any desired distance from the furnace, the difference being only in the lengths of the pipes *a b* and conducting-wires *c d*.

Now with the device thus constructed, if the tank or radiator should become too hot, such excessive heat will act upon the thermostat-bar D and cause it to make contact with the contact-post *e*, and thus close the electric circuit (which is normally open) and thereby energize the magnets C to attract their armature E. As the armature E turns on its pivotal connection with the upright *g* the forward end of the rod or bar F will be lowered, carrying with it the vertical rod G. This movement of the vertical bar, it will be seen, opens the damper in the pipe or stack *j* and closes the door or damper *k* of the furnace, thereby causing the temperature of said furnace to be reduced, and consequently causing a reduction of the temperature of the tanks or radiators.

It is evident that the device may be worked on a normally-closed circuit, instead of an open circuit, with slight variations in some of the mechanical details.

Slight changes might be made in the details of construction of my invention without

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departing from the spirit thereof or limiting its scope. Hence I do not wish to limit myself to the precise details of construction above set forth; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a water-heater and a tank or radiator connected therewith, of a thermostat-bar extending into and projecting beyond the tank or radiator, an electro-magnet, an electric circuit including the thermostat-bar, the electro-magnets and a contact, and dampers connected with the armature of said electro-magnet, so that when the electric circuit is opened or closed by the thermostat-bar one of said dampers will be open and the other closed, substantially as set forth.

2. The combination, with a water-heater and a tank or radiator connected therewith, of a thermostat-bar extending into and beyond the tank or radiator, an electro-magnet, an electric circuit including said electro-magnet, a contact, and the thermostat-bar, a rod or bar secured to the armature of said electro-magnet, a rod connected at a point between its ends to the end of the said rod or bar, and dampers connected to the ends of said rod, substantially as set forth.

3. The combination, with a furnace, a water-tank or radiator, a smoke-pipe, and doors or dampers in the smoke-pipe and furnace, of a thermostat-bar extending into and beyond the tank or radiator, an electro-magnet, an electric circuit including said electro-magnet, a contact, and the thermostat-bar, a rod or bar secured to the armature of the electro-magnet, and a rod connected at a point between its ends to the end of said rod or bar, said rod being connected at one end to the damper of the furnace and at the other end to the damper in the smoke-pipe, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WASHINGTON H. KILBOURN.

Witnesses:

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FRANKLIN C. FESSENDEN.

MERCOID EXHIBIT XXX-5

1124

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E. R. TEAL, EXECUTRIX.

AUTOMATIC TEMPERATURE REGULATOR.

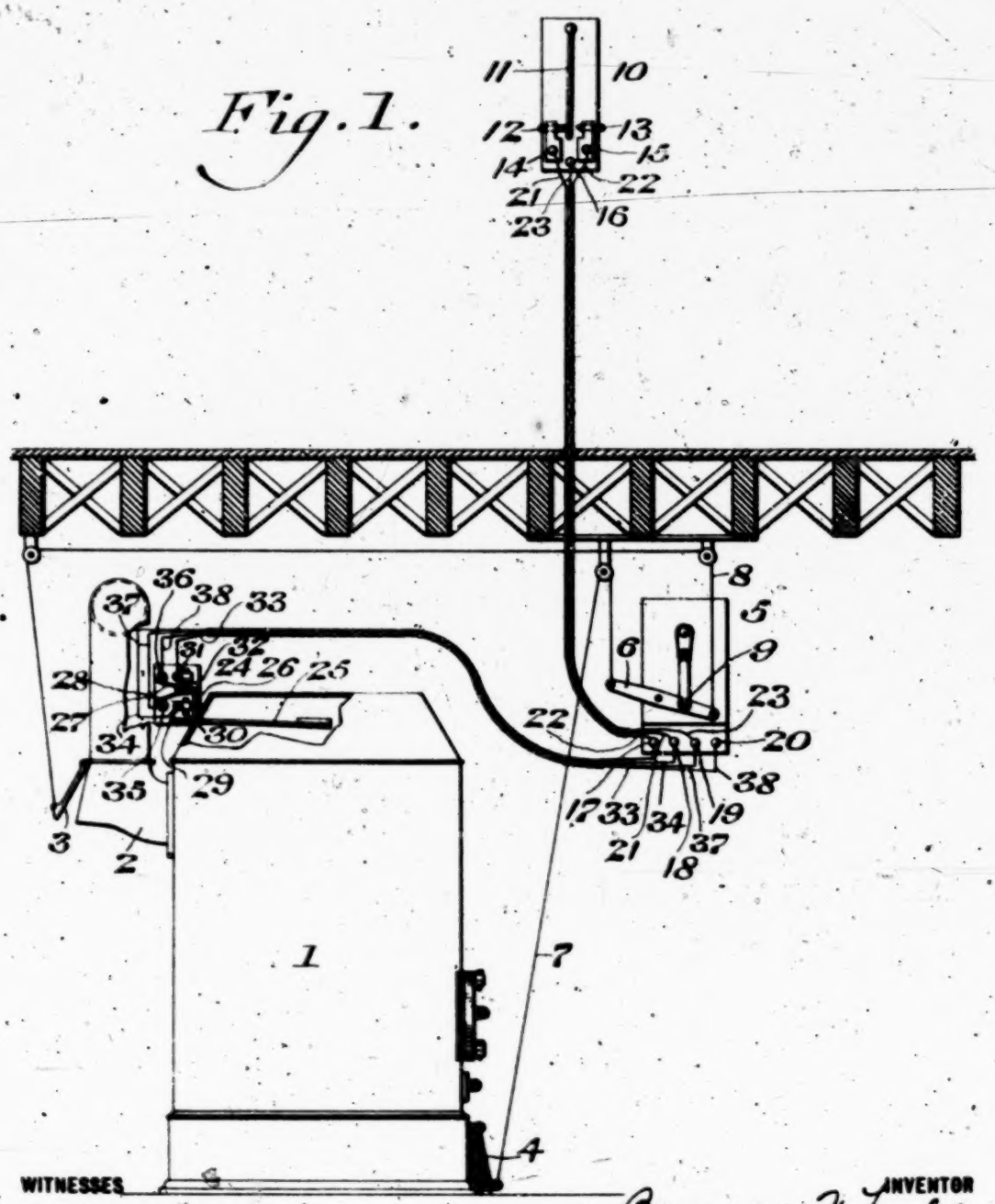
APPLICATION FILED JULY 22, 1910.

1,067,627.

Patented July 15, 1913.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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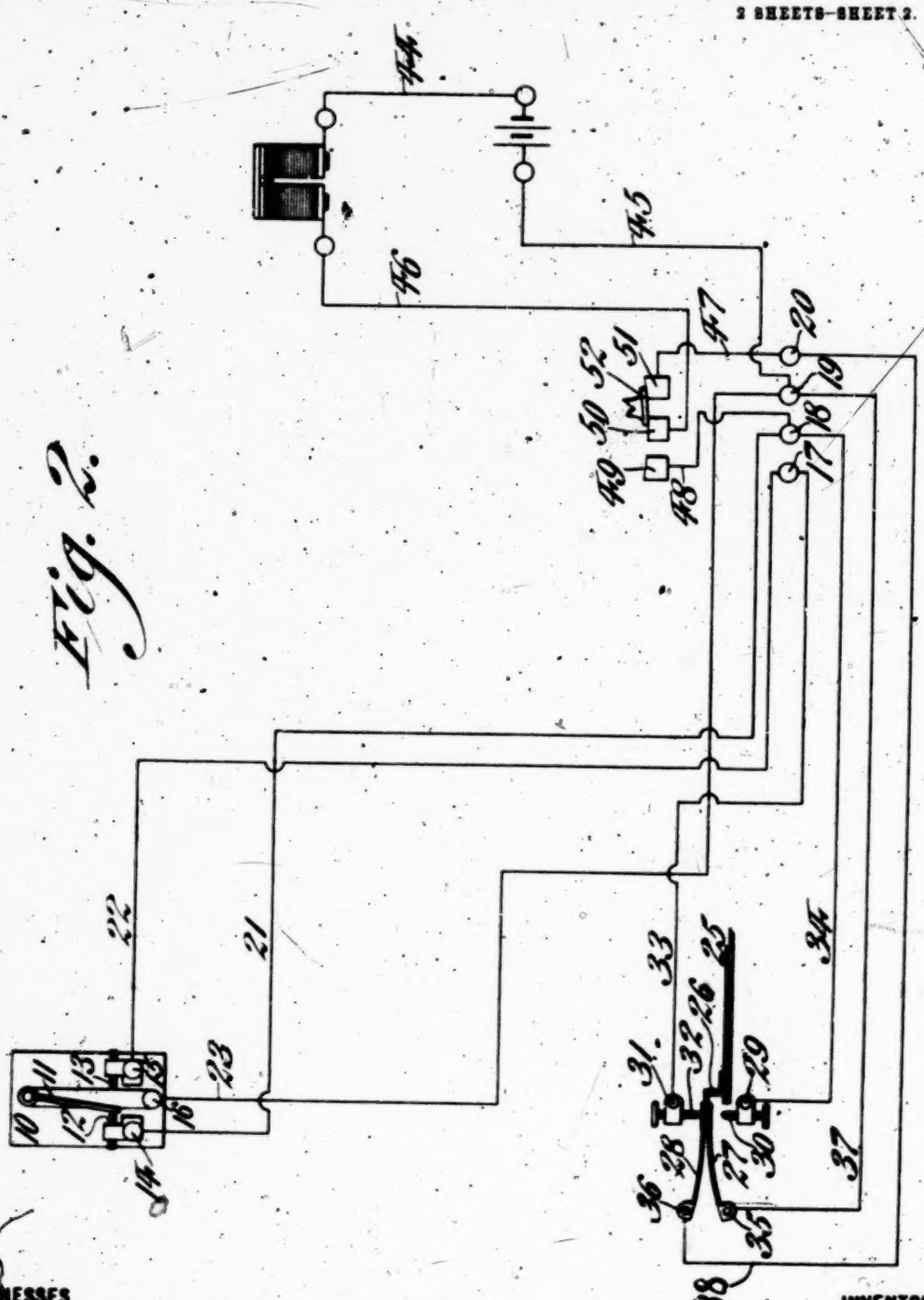
B. F. TEAL, DEC'D.
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AUTOMATIC TEMPERATURE REGULATOR.
APPLICATION FILED JULY 22, 1910.

1,067,627.

Patented July 15, 1913.

2 SHEETS—SHEET 2.

Fig. 2.



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AUTOMATIC TEMPERATURE-REGULATOR.

1,067,627. Specification of Letters Patent. Patented July 15, 1913.

Application filed July 22, 1910. Serial No. 573,163.

To all whom it may concern:

Be it known that I, BENJAMIN F. TEAL, a citizen of the United States, residing at Glenside, county of Montgomery, State of Pennsylvania, have invented a new and useful Automatic Temperature-Regulator, of which the following is a specification.

My invention relates to new and useful devices for automatically regulating temperatures, in which the controlling action is derived from the source of heat or cold from which the desired temperature is produced. While such a device is capable of a large range of applications in the regulation of both heat and cold, the particular form hereinafter shown and described, is for regulating temperature in the heating of buildings by the ordinary means of hot air, although equally applicable to hot water and steam. In one class of existing devices of this character, the regulation is obtained from a thermostat located in the room to be heated, by which the effects of the maximum and minimum temperature, for which the instrument is adjusted, are electrically transmitted to a suitable mechanism for operating the furnace draft, and thereby regulating the fire so as to maintain the desired temperature in the room. A very serious defect, inherent in this method of regulation, lies in the fact that, so long as the temperature of the room is below the degree for which the thermostat is adjusted, the draft of furnace remains on, and as a consequence, the fire may burn away to a degree which is not only wasteful of fuel, but also, in the case of many furnaces, may become dangerous from overheating of the furnace and of the pipes for conveying the hot air throughout the building. It is obvious, therefore, that economy and safety require that a certain amount of attention and hand regulation be resorted to, to supplement this incomplete automatic action of the device. In another type of apparatus the device is attached to and actuated by the source of heat or temperature changing device; for example, the hot air furnace or the boiler, and controls the fire by operating the furnace drafts independently of the temperature of the room or rooms to be heated. In this case, so long as the temperature is below the maximum degree for which the thermostat is adjusted, the drafts will remain on, although the temperature of the room may be far in excess of the required point. The only remedy for this defect is hand regulation.

The object of my invention is to provide—In combination with a furnace regulation by the temperature of the room—a supplemental control of the heating source or temperature generator by means of its own temperature, and to do this by a method which renders the action of each of the two elements independent for shutting off the furnace drafts, but which makes them interdependent in putting drafts on. The result of the combination is that the respective deficiencies of the two before named systems are provided for in a manner which renders the control absolutely automatic; not only obviating the necessity for hand regulation, but also insuring a reliable temperature (in rooms) for a given adjustment.

In carrying out my invention, I employ a thermostat suitably located in one of the rooms to be heated; a supplemental thermostat located in, or in suitable relation to, the temperature generator; and a suitable means, common to and electrically connected to, both, for operating the furnace drafts.

For the purpose of a clearer description I have designated a thermostat, located in a room to be heated, as the "controller" and a second instrument suitably connected with the hot air chamber or furnace, the "thermostat". The means for actuating the furnace draft is called a "motor" and is common to both controller and thermostat.

In the drawings I have shown a construction for the automatic control of the furnace, which I have found operates successfully in practice, but it will be evident that the arrangement of the parts and application may be varied; other instrumentalities may be employed, and changes may be made in the construction which will come within the scope of my invention, and I do not therefore desire to be limited, in every instance, to the exact form as herein shown and described, since the same is only by way of illustration of the spirit of my invention and I desire to make such changes as may be necessary.

Figure 1 represents a diagrammatic view showing a furnace and the means for automatic regulation of the temperature, in suitable connection therewith. Fig. 2 repre-

sents a diagrammatic view on an enlarged scale, showing the electrical circuits.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings: 1 designates a furnace suitably located, having a smoke flue 2 controlled by a damper 3 for check draft, and having a damper 4 controlling the air admission or draft to the furnace.

5 designates a motor, suitably situated with respect to the furnace, which is of any suitable or desired construction, and which, in the present instance, is provided with a lever 6 in suitable connection with the operative parts of the motor, one end of which lever is connected with the damper 4 by means of the connection 7; while the opposite end of the lever is suitably connected with the damper 3 for a check draft, by the connection 8, said connections being secured to said lever upon opposite sides of its pivotal point 9.

10 designates a controller which is located at a suitable point in a room or other locality to be heated, said controller being of any suitable or desired construction, and is provided with a thermostatic element 11, one end of which is suitably connected with the controller, and the opposite end is movable between, and is adapted to contact with, one or the other of the two contact points 12 and 13 which are suitably mounted upon the controller 10.

14 designates a binding post in suitable connection with the contact point 12 and 15 designates a binding post in suitable connection with the contact point 13, said controller 10 having a third contact post 16 which is in suitable connection with the battery.

17 designates a connection binding post carried by the motor 5, which latter is also provided with a binding post 18, which is in suitable connection with the operative parts of the motor, in order that when the circuit is closed the motor is actuated to close the drafts, as will be hereinafter set forth.

19 designates a binding post which is in suitable connection with the battery of the motor, and 20 designates a binding post which is in suitable connection with the operative portion of the motor 5, in order that when the circuit is closed the motor is actuated to open the drafts, as will be hereinafter set forth.

21 designates a conductor, connected at one end with the binding post 14 of the controller, and at the opposite end, with the closing draft post 18 of the motor.

22 designates a conductor which is in suitable connection with the binding post 15 of the controller, and which is connected with the connection post 17 of the motor.

23 designates a conductor which is in suitable connection with the battery binding post 16 of the controller and with the battery post 19 of the motor.

24 designates a thermostat, which is suitably located with respect to the furnace, and which is of any suitable or desired construction, and which is provided with a thermostatic element 25 which, in the present instance, extends suitably into and is suitably supported in the furnace 1; said thermostatic element, 25, being provided with or having connected thereto, a member 26, formed of nonconducting material, a suitable portion of which is adapted to be seated between, and preferably in contact with, the two vibrators 27 and 28 which are suitably carried by the thermostat 24.

29 designates a binding post which is in suitable connection with a contact point 30 and 31 designates a binding post in suitable connection with a contact point 32, these parts being suitably mounted and supported by the thermostat 24, it being understood that the contact point 32, in the present instance, is one with which the vibrator 28 will contact when the temperature is such that the draft is on; and the contact point 30 is the one, in the present instance, with which the vibrator 27 will contact in order that the draft will be shut off.

33 designates a conductor which is in suitable connection with the connection post 17 of the motor, and with the binding post 31 of the thermostat 24.

34 designates a conductor which is in suitable connection with the closing draft post 18 of the motor, and with the binding post 29 of the thermostat 24.

35 designates a binding post on the thermostat and in suitable connection to the battery; and 36 designates a binding post also carried by the thermostat, it being noted that the binding post 35 is in suitable connection with the vibrator 27, and that the binding post 36 is in suitable connection with the vibrator 28.

37 designates a conductor which is in suitable connection with the battery post 19 of the motor, and also with the binding post 35 to the thermostat.

38 designates a conductor which is in suitable connection with the opening draft post 20, of the motor 5, and also with the binding post 36, of the thermostat 24.

As will be noted, the contact post 16 of the controller 10 is in suitable connection with the binding post 19 through the medium of the conductor 23 and that said binding post 19 is in suitable connection with the battery through conductor 45, while the said battery is in connection with the magnets through the medium of the conductor 44, said magnets being also connected with the contact point 50 of the motor through the medium of the conductor 46. The binding

post 18 is connected with the contact point 49 of the motor through the conductor 48 while the binding post 20 is connected with the contact point 51 of the motor through the medium of the conductor 47. It will be understood that the said contact points 49, 50 and 51 will be alternately in contact with the contact piece or switch 52 of the motor in order to close the proper circuits. As soon as the movement of the motor occurs through the magnets being energized by the completion of the circuit to the thermostats, the complete movement of the motor will shift the switch 52 from its then position to the opposite position thus opening the circuit previously established and closing it for the next movement of the thermostats. For example, it will be understood that the parts are in the position seen in Fig. 2, the strip 11 has been moved, by the temperature, to contact with the point 12, prior to which contact the contact piece 52 of the motor was in engagement with the contact point 49 and 50 of the motor and the flow of current at that time is as follows:—from the binding post 19, through the conductor 23, through the strip 11, point 12, conductor 21, binding post 18, through conductor 48 to contact point 49, through contact piece 52, contact point 50 and thence through the conductor 46, through the magnets and conductor 44 to the other pole of the battery, this closed circuit energizes the magnets to operate the motor in order to move the contact piece 52 in order that the same will contact both with the contact point 50 and 51 as shown, the circuit through 49 is broken, and at the same time moving the dampers to shut off the draft. Should the strip 27 be in contact with the point 30 the flow of current will now be from the binding post 19 through the conductor 37 through strip 27, point 30 and through conductor 34 to binding post 18 and thence through the magnet to the battery, as previously described, it being understood that the contact piece 52 was then in engagement with the contact points 49 and 50.

The above description will show the absolute independence of the two circuits in closing the dampers to close the draft. To show the interdependence of the circuits to put on the dampers, the following would be the course of the current:—from binding post 19, through conductor 23, through strip 11 and point 13, through conductor 22, binding post 17, through conductor 33 to point 32, through strip 28 and conductor 38 to binding post 20, through conductor 47, through contact point 51, contact piece 52 and contact point 50, through conductor 46 to magnets and conductor 44 to the battery, thus completing the circuit. From this it will be seen if either of the strips 11 or 28 are out of contact with their proper points, the circuit will not be closed and so the dampers cannot be opened to put on the draft.

The operation of the device is as follows: When the parts are in the position seen in the figures it will be noted that the thermostatic element 11, of the controller 10, is in contact with the contact point 12; while the vibrator 28 is in contact with the contact point 32. In this position the draft is off, that is to say, the air damper 4 is closed by reason of the fact that the circuit which actuates the motor, for opening the damper, is open, since the current would, when the parts are in this position, pass from the battery post 19, through the conductor 23, to the binding post 16, and through the thermostatic element 11, to the contact point 12, and through the binding post 14, and conductor 21, to the closing binding post 18 on the motor, which would operate the latter to move the lever 6 to a position to close the damper 4 and open the damper 3, by means of the connections 7 and 8. Should, however, the temperature in the room fall below the desired point, the thermostatic element 11 will be actuated or moved, by this, over into contact with the contact point 13, immediately upon which the circuit will be closed in the following manner: from the battery post 19 through the conductor 23 to the binding post 16, thence to the thermostatic element 11, through the contact point 13, through the binding post 15, conductor 22, to post 17, by the conductor 33 to the binding post 31, and thence through the contact point 32, and through the vibrator 28, through the binding post 36, and the conductor 38, to the opening binding post 20, on the motor, which is actuated to open the damper 4, and to close the damper 3, the same remaining in this position until the desired temperature in the room is reached, when the thermostatic element 11 is returned to its position seen in the figures, at which time (except under conditions as hereinafter stated) the motor is operated as previously described, to again close the damper 4 and to again open the damper 3. It will thus be seen that in order to throw on the draft it is necessary for the circuit to pass through the controller and through the thermostat, so that it is necessary that the thermostatic element of both of these parts be in proper position, so that the on-draft circuit is closed, thus the controller and thermostat are interdependent for throwing or putting on the draft.

In some instances it may occur that while the temperature in the room has not been raised to a sufficient point to actuate the thermostatic element 11 to close off the draft, the fire in the furnace would reach a predetermined temperature where it is de-

sirable to check the draft; when this occurs the thermostatic element 25 of the thermostat will be actuated in order to move the vibrator 27 into contact with the contact point 30, thus removing the vibrator 28 from contact with the contact point 32, immediately upon which the circuit will be closed from the battery post 19 through the conductor 37 to the binding post 35, through the vibrator 27, contact point 30, binding post 29, and conductor 34, to the closing binding post 18, of the motor 5, which latter will immediately be actuated to close the damper 4 and open the check draft damper 3 and stop the draft. It will thus be seen that the controller and the thermostat are independent of each other for closing the damper and so shutting off the draft, that is to say, the thermostatic element of the controller, in one position, closes a circuit with the motor for shutting off the draft this being accomplished through the circuit from the battery binding post 19 through conductor 23 and the binding post 16 of the controller through thermostatic element 11, contact point 12, binding post 14, conductor 21, through binding post 18 of the motor which closes the circuit and is operated to close the drafts. The thermostatic element of the thermostat in one position closes a circuit with the motor for shutting off the draft, the circuit in this position being through the battery binding post 19, through conductor 37, binding post 35, vibrator 27 of the thermostat, contact point 30, binding post 29 and conductor 34 to the motor binding post 18 which closes the circuit to close or shut off draft. In this way it will be seen that the controller and the thermostat are independent of each other, through the circuits just described, for closing the damper and so shutting off the draft. To put on the draft, both of the thermostatic elements are in a third circuit with the motor, in order that both thermostats must be in proper position to close the said third circuit to put on the draft, this circuit being as follows: from the battery binding post 19 through the conductor 23, binding post 16, thermostatic element 11 with the contact point 13, against which the element 11 has been moved, through the binding post 15, conductor 22, binding post 17, conductor 33, binding post 31, contact point 32, vibrator 28 of the thermostat, binding post 36, conductor 38 to binding post 20 of the motor which closes the circuit to operate the opening of the draft. From this it will be seen that if either of the thermostatic elements 11 or 28 are out of contact with the respective contact points 13 and 32 the circuit will not be closed, and the draft will not be put on, or, in other words, the controller and the thermostat are interdependent in order to put on the draft.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character stated, a temperature changing device, a controlling means located at a suitable point and adapted to be actuated, depending upon the temperature thereat, a second controlling means situated within said temperature changing device, and subjected directly to the radiant heat and to the products of combustion of the fire without the interposition of a transmitting medium, actuating means in suitable connection with said temperature changing device for controlling the same, and electrical circuits between said first controlling means and actuating means, and between said second controlling means and said actuating means, whereby the actuating means is operated to increase or decrease the action of the temperature changing device, said electrical circuits being interdependent for increasing the action and independent for decreasing the same.

2. In a device of the character stated, a temperature changing device, a controller located at a suitable point and adapted to be actuated, depending upon the temperature thereat, a thermostat situated within said temperature changing device and subjected directly to the radiant heat and to the products of combustion of the fire without the interposition of a transmitting medium, a motor in suitable connection with said temperature changing device for controlling the same, and electrical circuits between said controller and motor, and between said thermostat and motor, whereby the motor is actuated to increase or decrease the action of the temperature changing device, said electrical circuits being interdependent for increasing the action and independent for decreasing the same.

3. In a device of the character stated, a temperature changing device, a controller actuated by the temperature at a desired point, a thermostat situated directly within said temperature changing device and subjected directly to the radiant heat and to the products of combustion of the fire without the interposition of a transmitting medium, a motor in suitable connection with said temperature changing device for controlling the same, an electrical circuit for each movement between said controller and said motor for actuating said motor to decrease the action of said changing device, an electrical circuit for each movement between said thermostat and said motor for actuating said motor to decrease the action of said changing device, and an electrical connection between said controller, said thermostat and said motor to increase the action of said temperature changing device.

4. In a device of the character stated, a

temperature changing device, a motor in suitable connection with said changing device to control the same, a controller having a thermostatic element, an electrical circuit for said controller and said motor, said element in one position closing said circuit to actuate said motor to decrease the action of said changing device, a thermostat having a thermostatic element situated within said temperature changing device and subjected directly to the radiant heat and to the products of combustion of the fire without the interposition of a transmitting medium, an electrical circuit for said thermostat and said motor, said element in one position closing said circuit to actuate the motor to decrease the action of said changing device, and an electrical circuit between said motor, said controller and said thermostat, the last mentioned circuit being controlled by the two thermostatic elements, and said circuit being closed, when said elements are in their other positions, respectively, to actuate the motor to increase the action of the said changing device.

BENJAMIN F. TEAL.

Witnesses:
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1703

MERCOID EXHIBIT XXX 6-

Oct. 5, 1926. 1,602,363

J. C. JOHNSON

ELECTRICAL CONTROL MECHANISM FOR FUEL OIL BURNERS

Filed Jan. 11, 1926

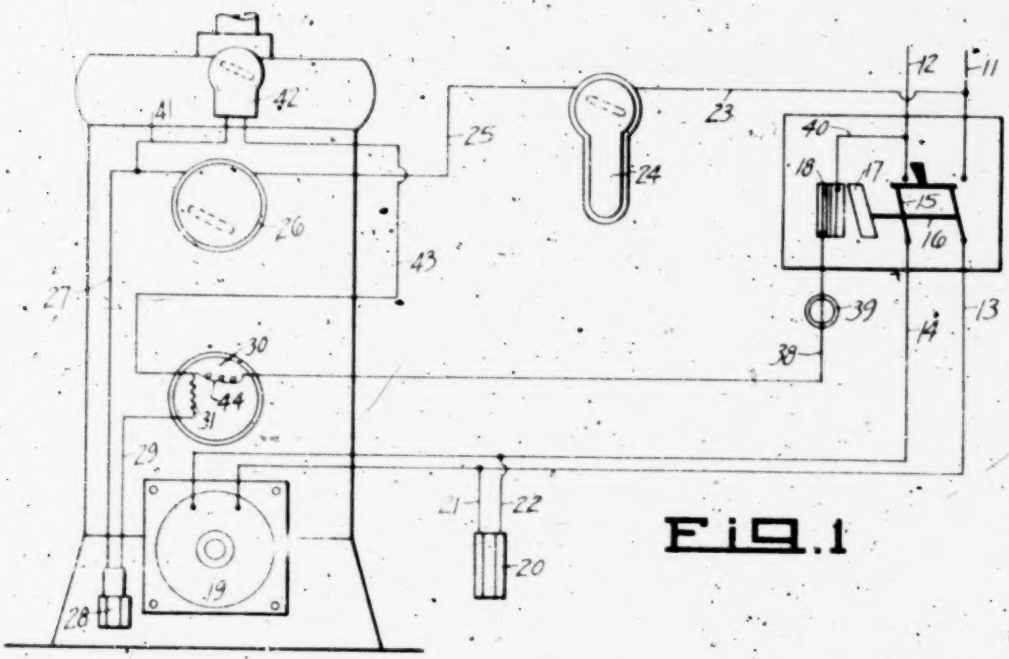


Fig. 1

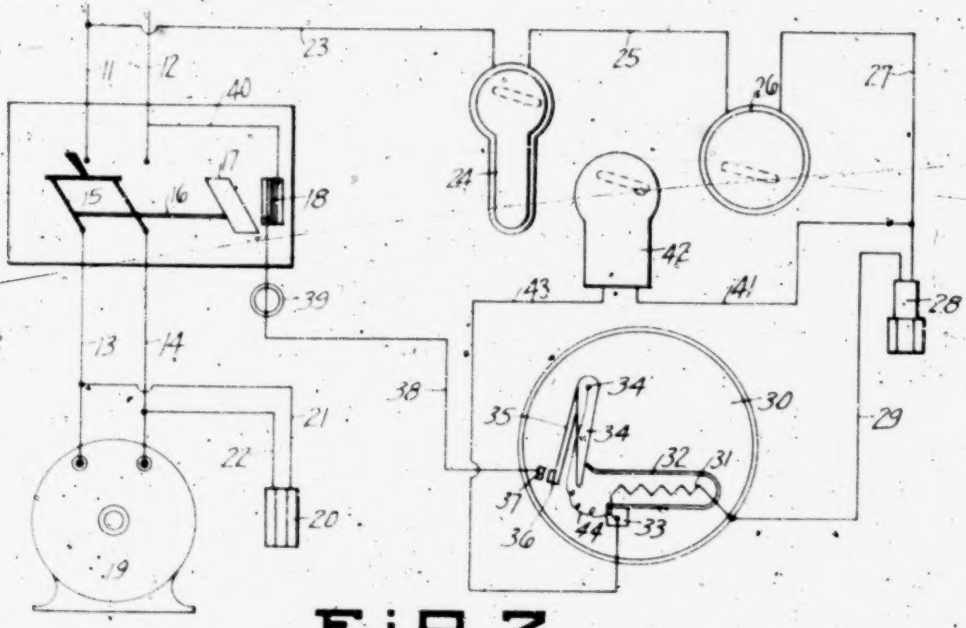


Fig. 2

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Patented Oct. 5, 1926. 1,602,363

UNITED STATES PATENT OFFICE.

JESSE C. JOHNSON, OF OAKLAND, CALIFORNIA, ASSIGNOR TO S. T. JOHNSON CO., OF OAKLAND, CALIFORNIA.

ELECTRICAL CONTROL MECHANISM FOR FUEL-OIL BURNERS.

Application filed January 11, 1926. Serial No. 80,659.

This invention relates to an electrical control mechanism for fuel oil burners of the rotary type, in which the operation is initiated or discontinued according to the temperature of the room or other inclosure whose temperature is to be regulated.

While not limited in application, my improved controlling system is more particularly designed for use in dwelling houses and is adapted for application to furnaces which may already be installed therein.

One of the objects of the present invention is the provision of means for controlling the operation of an electric motor which operates the burner and supplies fuel and air for the purpose of combustion, through the medium of a thermostat located in the room whose temperature is to be regulated. This object is effected by merely utilizing the thermostat as a medium for opening the circuit to an electro-magnetic control, operatively associated with the main circuit switch for the motor current.

Another object is the provision of means for controlling an electro-magnetic circuit, operatively associated with the main circuit switch for the motor current, through the medium of a boiler control means, responsive to conditions of temperature within the boiler.

A further object is to automatically stop the motor and the fuel oil supply system of the burner, when the controlling circuit is opened by a manually snap switch button.

Another object is to reduce the gas supply to the pilot frame, after a short interval of time when the burner is ignited.

Another object is to shut down the burner system automatically if the fuel oil supplied to the burner has failed to ignite, or if the fuel oil supply should fail.

Other objects will be made manifest in the following specification of an embodiment of the invention illustrated in the accompanying drawings, in which:

Figure 1 illustrates an oil burning furnace equipped with my improved control mechanism; and

Fig. 2 a diagrammatic view of the electric circuit control mechanism of my invention.

The operating current is obtained from the conductors 11 and 12 to which the service wires 13 and 14 are connected by a double pole single throw main current switch 15. Operatively associated with the main current switch 15, by means of an operating bar 16, is an electro-magnetic control 17 provided with an electro-magnetic coil 18.

The wires 13 and 14 constitute the circuit wires to the burner motor 19. An electro-magnetic fuel oil stop valve 20, interposed in the fuel oil supply line between the source of supply and the burner, is connected in parallel by wires 21 and 22 to wires 13 and 14 respectively, of the motor circuit.

This fuel oil stop valve is preferably controlled by the main circuit switch 15 in the electric circuit that operates the motor, the parts being arranged so that the said valve is held open to permit the flow of oil to the burner so long as the current passes to the motor and is closed to positively shut off the supply of oil to the burner when the motor stops.

A wire 23 extends from the conductor 11 to a room thermostat 24, illustrated diagrammatically, of any well known construction, which remains in a closed position when cold or when the atmosphere at this place is below a certain predetermined temperature, and opens to interrupt the circuit when the atmosphere at this place is above a certain predetermined temperature.

The thermostat 24, is connected in series by wire 25 to a boiler temperature controlled circuit breaker 26, illustrated diagrammatically. This boiler controlled circuit breaker has connection with the steam header of the boiler and is arranged to flex its thermostatic member, when a steam pressure above a predetermined maximum obtains in the boiler to break the circuit.

Connected in series with the boiler temperature controlled circuit breaker 26, by way of wire 27, is an electro-magnetic gas valve 28.

Connected in series with the electro-magnetic gas valve 28, by way of wire 29, is an electrically operated time limit safety control 30. This time limit safety control comprises a heating coil 31, a thermostatic metal member 32, with one end secured at 33 and the other end bearing against a member 34, pivoted at 34'. The metallic member 32 partly surrounds the heating coil 31 and bends away from member 34 when heated. Member 34 is connected through a flexible lead 35, having contactor 36, which is held

against contactor 37, by the end of the thermostatic member 32, to wire 38. Wire 38 leading to the electro-magnetic coil 18 of magnetic control 17.

A manually operated circuit control button snap switch 39 is interposed in wire 38, near or adjacent to the electro-magnetic control 17. A wire 40 leading from the electro-magnetic control to conductor 12.

The series circuit then being complete, leading from conductor 11 by way of wire 23 through thermostat 24, wire 25 to boiler controlled circuit breaker 26, wire 27 to electro-magnetic gas valve 28, wire 29 to time limit safety control 30, wire 38 to electro-magnetic coil 18 and by way of wire 40 to conductor 12.

The shunt out circuit for the electro-magnetic gas valve 28, and to the time limit safety control 30, comprises a branch wire 41, connected to and leading from wire 27 to the fire stack switch 42, a wire 43 extends from the stack switch 42 to the time limit safety control 30 and is connected at 33 with wire 44, said wire 44 forming a shunt circuit between wire 33 and the member 34 of the time limit safety control.

Said shunt circuit being designed to carry its shunted proportion of the current necessary to retain a closed series circuit to the electro-magnetic control, to retain the same in a closed position when the burner is ignited and operating.

This fire stack switch 42 is positioned where its thermostatic member is subjected to the heat from the burner gases. When the burner has been ignited and has burned for a short interval, the thermostatic member of this stack switch will flex to a circuit closing position, thus shunting out the circuit, to the electro-magnetic gas valve 28 and to the heating element 31 of the time limit safety control 30.

The action of the circuits including the operation of my burner control mechanism will now be described.

The closing of the circuit by means of the manually operated current control button snap switch 39 completes the regulating circuit from conductor 11 by way of wire 23 to the thermostat 24, by wire 25 to the boiler control 26, by wire 27 to the electro-magnetic gas valve 28, by wire 29 to the time limit safety control 30, by wire 38 to the electro-magnetic control 17 and by way of wire 40 to conductor 12.

This forms a series control circuit in which the breaking of any of the connections in the circuit would cause the entire circuit to become open and inoperative. This closing of the control circuit by button snap switch 39 energizes the electro-magnetic coil 18 to draw control element 17 into engagement therewith, also closing the double pole single throw main circuit switch 15, operatively associated with element 17 by means of an operating bar 16, thus closing the circuit to the motor. The closing of the motor circuit also operates to energize the electro-magnetic fuel oil valve 20 and a supply of fuel oil to the burner results.

The circuit to the motor is not connected in series with the said series circuit, but directly controlled by this series circuit through the means of the electro-magnetic control 17, operatively associated with the main current switch 15 of the motor circuit. The current supply circuit to the motor is connected in multiple with the said controlling series circuit.

By this arrangement the full current voltage becomes immediately available to operate the motor 19 and the fuel oil stop valve 20, connected in parallel with the motor circuit, uninfluenced by the said series circuit.

This is of considerable importance in this invention.

It has been found in practice to be of great advantage, in overcoming special difficulties in the operation of an oil burning unit controlled electrically, to provide means whereby the motor will operate to its limit capacity immediately after the operating circuit is closed. To include the motor circuit within a series connection, has a tendency to materially reduce the voltage of the current available for use by the motor, resulting in a retarded operation of the motor.

Simultaneously with the closing of the regulating circuit, the electro-magnetic gas valve 28 being energized to open, permitting of a larger flow of gas to the pilot burner to temporarily enlarge the flame thereof. The fuel oil supply issuing from the fuel oil stop valve being ignited by the enlarged flame of the pilot burner and commences heating the furnace.

The heat from the burner gases soon bows the thermostatic member of the stack switch 42, to a closed position, closing the circuit between wires 41 and 43, thus shunting out the circuit by way of wire 27 to the electro-magnetic gas valve 28 and by way of wire 29 to the heating element 31 of the time limit safety control 30. Shunting out the circuit to the electro-magnetic gas valve 28 in this manner causes the gas valve to close, thereby reducing the pilot flame to its normal condition.

The operating control circuit then being complete from conductor 11 by wire 23 to thermostat 24, wire 25 to boiler control 26, from wire 27 by way of wire 41 to stack switch 42, wire 43 to shunt wire 44 and flexible lead 35 to contactors 36 and 37, wire 38 to the magnetic coil 18 and by way of wire 40 to conductor 12.

With the burner now running steadily, assume that an excessive steam pressure is

generated in the boiler, or the room atmosphere reaches a predetermined temperature. This will act upon either, the thermostatic control 24 or on the boiler control 26 to open their respective contacts, thus interrupting the control circuit, de-energizing the electro-magnetic coil 18 of the control 17. This de-energizing of the coil 18 allows the control 17 to fall backwards by its own weight also removing with it the main current switch 15, operatively associated with the same, to an open position thus interrupting the circuit to the motor.

The fuel oil stop valve 20 operates synchronously with the motor, it is opened simultaneously with the operation of the motor and is closed to positively shut off the supply of fuel oil to the burner when the motor stops.

The burner is now shut off. Meanwhile, the thermostatic members of the room thermostat or of the boiler control respectively, are cooling and contracting to the cold point or the closing position, the burner will remain in a shut off condition, until the undesirable conditions in the boiler are corrected, or the temperature of the room has lowered. The gradual lowering of the pressure within the boiler, or a reduced room temperature will eventually complete and close again the control circuits through the thermostat 24 or through the boiler control 26.

This completion of the control circuit will again automatically close the electro-magnetic control 17 including the main current switch to again operate the motor including the fuel oil valve, while at the same time an enlarged flame from the pilot burner will again ignite the fuel oil.

But should there be no ignition of the burner for any reason whatever, as when there is no fuel, or the fuel delivered should fail to be ignited, if for any reason the gas pilot has blown out, there would be no resulting increase in temperature within the furnace and the thermostatic member of the stack switch 42 would receive no heat and consequently would fail to move to a circuit closing position.

The current taken to operate the electro-magnetic control 17 would continue to pass through the time limit safety control 30 and particularly through the heat coil 31. Meanwhile, the metallic member 32 of the time limit safety control 30 being heated by the heat coil 31, bends towards heating coil 31 and frees member 34, thereby interrupting the control circuit between contactors 36 and 37 resulting in de-energizing of the electro-magnetic coil 18 of the control 17 opens switch 15 and stops the burner mechanism. A manual reset is required after thermostatic member 32 has cooled before the circuit can again be closed automatically. This manual reset is effected by means of a push button provided for this purpose, on the exterior of the casing inclosing this device.

I am aware that various forms of thermostatic controls have been used commercially for diverse purposes, and I do not claim these individual controls in detail.

What I claim and desire to secure by Letters Patent is:

1. In an electrical control mechanism for fuel oil burners having, in combination, electric current conductors, a motor for rotating the burner, a circuit connection between the motor and the current conductors, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively connected with said main circuit switch for controlling its operation, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, in a series circuit with the said electro-magnetic control a time limit safety control, an electro-magnetic gas valve, a boiler controlled means for opening the circuit to said electro-magnetic control under predetermined boiler conditions so as to substantially de-energize the electro-magnetic control to open the main circuit switch to interrupt the motor circuit and then again under predetermined condition to close said circuit to re-energize said electro-magnetic control to close the main circuit switch to again operate the motor, a temperature actuated stack switch, consisting of a thermostatic member located in the burner stack, arranged to be open when cool and to close when said member is heated, said stack switch being so connected in said series circuit as to shunt out the electric circuit to the electro-magnetic gas valve and to the time limit safety control when the burner is ignited.

2. In an electric control mechanism for fuel oil burners having, in combination, electric current conductors, a motor for rotating the burner, a circuit connection between the motor and the current conductors, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively connected with said main circuit switch for controlling its operation, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, in a series circuit with the said electro-magnetic control a time limit safety control, an electro-magnetic gas valve, a boiler controlled means for opening the circuit to said electro-magnetic control under predetermined boiler conditions so as to substantially de-energize the electro-magnetic control to open the main circuit switch to interrupt the motor circuit and then again under predetermined conditions to close said circuit to re-energize said electro-magnetic control to close the main circuit switch to again

operate the motor, a temperature actuated stack switch, consisting of a thermostatic metal member located in the stack, arranged to be open when cool and to close when said member is heated, said stack switch being so connected in said series circuit as to shunt out the electric circuit to the electro-magnetic gas valve when the burner is ignited.

3. In an electrical control mechanism for fuel oil burners having, in combination, electric current conductors, a motor for rotating the burner, a circuit connection between the motor and the current conductors, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively connected with said main circuit switch for controlling its operation, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, in a series circuit with the said electro-magnetic control, a time limit safety control, an electro-magnetic gas valve, a boiler controlled means for opening the circuit to said electro-magnetic control under predetermined boiler conditions so as to substantially de-energize the electro-magnetic control to open the main circuit switch to interrupt the motor circuit and then again under predetermined condition to close said circuit to re-energize said electro-magnetic control to close the main circuit switch to again operate the motor, a temperature actuated stack switch, consisting of a thermostatic metal member located in the burner stack, arranged to be open when cool and to close when said member is heated, said stack switch being so connected in said series circuit as to shunt out the electric circuit to the time limit safety control when the burner is ignited.

4. In an electric control mechanism for fuel oil burners having, in combination, electric current supply conductors, a motor for rotating the burner, a circuit connection between the motor and the current conductors, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively connected with said main circuit switch for controlling its operations, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, in a series circuit with the said electro-magnetic control, a time limit safety control, an electro-magnetic gas valve and thermostatic operated means for controlling the circuit to said electro-magnetic control between desired limits of temperature so as to substantially de-energize the electro-magnetic control to open the main circuit switch to interrupt the motor circuit when the temperature passes the desired limit and then again, when the temperature falls below the desired limit to re-energize said electro-magnetic control to again close the main circuit switch to the motor, a temperature actuated stack switch, consisting of a thermostatic member located in the burner stack, arranged to be open when cool, forming, when closed by heat from the burner a shunt out circuit around the electro-magnetic gas valve and the time limit safety control, so as to shunt out the electro-magnetic gas valve and the time limit safety control when the burner is ignited.

5. In an electrical control mechanism for fuel oil burners having, in combination, electric current supply conductors, a motor for rotating the burner, a circuit connection between the motor and the current conductors, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively connected with said main circuit switch for controlling its operations, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, in a series circuit with the said electro-magnetic control a time limit safety control, an electro-magnetic gas valve and thermostatic operated means for controlling the circuit to said electro-magnetic control between desired limits of temperature so as to substantially de-energize the electro-magnetic control to open the main circuit switch to interrupt the motor circuit when the temperature passes the desired limit and then again, when the temperature falls below the desired limit to re-energize said electro-magnetic control to again close the main circuit switch to the motor, a temperature actuated stack switch, arranged to be open when cool, forming, when closed by heat from the burner a shunt circuit around the electro-magnetic gas valve so as to shunt out the electro-magnetic gas valve when the burner is ignited.

6. In an electrical control mechanism for fuel oil burners having, in combination, electric current supply conductors, a motor for rotating the burner, a circuit connection between the motor and the current conductors, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively connected with said main circuit switch for controlling its operations, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, in a series circuit with the said electro-magnetic control a time limit safety control, an electro-magnetic gas valve and thermostatic operated means for controlling the circuit to said electro-magnetic control between desired limits of temperature so as to substantially de-energize the electro-magnetic control to open the main circuit switch to interrupt the motor circuit when the temperature passes the desired limit and then again, when the temperature falls below the desired limit to re-energize said electro-magnetic control to again close the main circuit switch to the motor, a temperature actu-

ated stack switch, arranged to open when cool, forming, when closed by heat from the burner a shunt circuit around the time limit safety control so as to shunt out the time limit safety control when the burner is ignited.

7. In an electrical control mechanism for fuel oil burners having, in combination, an electric current supply, a motor for rotating the burner, a circuit connection between the motor and the current supply, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively associated with said main circuit switch for controlling its operation, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, in a series circuit with said electro-magnetic control a thermostat for controlling the series circuit to said electro-magnetic control between desired limits of temperature and controlling means responsive to boiler conditions for breaking the circuit between said thermostat and the said electro-magnetic control for rendering the operation of the motor and of the fuel oil stop valve means dependent upon boiler conditions.

8. In an electrical control mechanism for fuel oil burners having, in combination, an electrical current supply, a motor for operating the burner, a circuit connection between the motor and the current supply, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively associated with said main circuit switch to control its operation, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, in a series circuit with said electro-magnetic control, controlling means responsive to boiler conditions for opening and closing the circuit to said electro-magnetic control, a thermostat for breaking the circuit between said boiler controlled means and the said electro-magnetic control between desired limits of temperature and for rendering the operation of the motor and of the fuel stop valve dependent upon temperature conditions.

9. In an electrical control mechanism for fuel oil burners having, in combination, electric current conductors, a motor for rotating the burner, an electric circuit connection between the motor and the conductors, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively associated with the main circuit switch to open and close the same, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, an electro-magnetic gas valve, an electrically actuated heat coil and a pair of contactors all connected in series with the said electro-magnetic control circuit, a thermostatic metal member in proximity of the heat coil to hold the contactors together when said member is cool, but to permit the contactors to separate and de-energize the heat coil when said member is heated and means for shunting out the electro-magnetic gas valve when the burner is ignited.

10. In an electrical control mechanism for fuel oil burners having, in combination, electric current conductors, a motor for rotating the burner, an electric circuit connection between the motor and the conductors, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively connected with the main circuit switch to open and close the same, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, an electro-magnetic gas valve, an electrically actuated heat coil and a pair of contactors, all connected in series with the electro-magnetic control circuit, a thermostatic metal member in proximity to the heat coil to hold the contactors together when said member is cool, but to permit the contactors to separate and break the circuit when said member is heated, to de-energize the electro-magnetic control to open said main circuit switch upon failure of said electro-magnetic gas valve to ignite the burner.

11. In an electrical control mechanism for fuel oil burners having, in combination, electric current conductors, a motor for rotating the burner, an electric circuit connection between the motor and the conductors, a main circuit switch for the motor, an electro-magnetic control circuit in multiple with the motor circuit operatively connected with the main circuit switch to open and close the same, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, an electro-magnetic gas valve, an electrically actuated heat coil and a pair of contactors, all connected in series with the electro-magnetic control circuit, a thermostatic metal member in proximity to the heat coil to hold the contactors together when said member is cool, but to permit the contactors to separate and break the circuit when said member is heated to de-energize the electro-magnetic control and open said main circuit switch upon failure of said electro-magnetic fuel oil stop valve to operate, resulting in failure of the burner to ignite.

12. In an electrical control mechanism for fuel oil burners having, in combination, a motor for rotating the burner, an electric circuit connection to said motor, a main circuit switch for said motor, an electro-magnetic control circuit in multiple with the motor circuit operatively connected with said main switch to open and close the same, an electro-magnetic fuel oil stop valve connected in parallel with the motor circuit, in a series circuit with the electro-magnetic control an electro-magnetic gas valve, an elec-

tric heat coil and a pair of contactors having a shunt connection between them, a thermostatic metal member in proximity to the heat coil to hold the contactors together when said member is cool, but to permit the contactors to separate when said member is heated, the shunt connection between the said contactors being designed to carry its shunted proportion of the current necessary to retain the electro-magnetic control circuit in a closed position when the burner is ignited.

In testimony whereof I affix my signature.

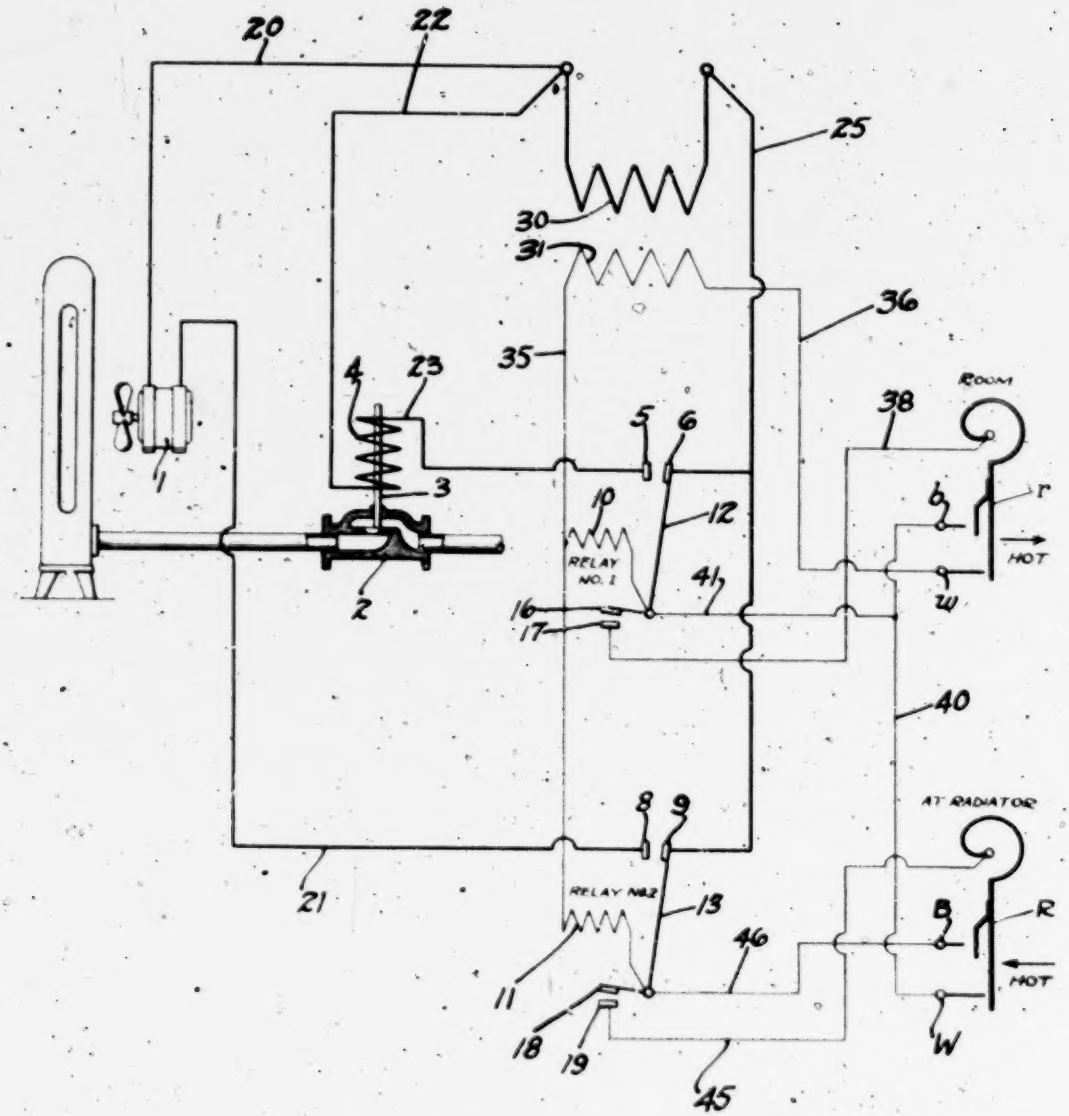
JESSE C. JOHNSON.

April 10, 1928. 1,665,801

H. W. SWEATT

UNIT HEATER CONTROL

Filed April 27, 1927



Inventor
HAROLD W. SWEATT
By Paul, Paul & Moore
ATTORNEYS

Patented Apr. 10, 1928. 1,665,801

UNITED STATES PATENT OFFICE.

HAROLD W. SWEATT, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO MINNEAPOLIS HEAT REGULATOR CO., OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA.

UNIT-HEATER CONTROL.

Application filed April 27, 1927. Serial No. 187,051.

This invention relates, generally to improvements in heat regulating devices and is particularly directed to the control of the circuit for a power driven fan, which fan is associated with a heating unit, such as a radiator, for the purpose of circulating air, heated by the radiator.

In the usual systems in which the fan of a unit heater is controlled by a room thermostat, it happens that the fan is frequently operated when the radiators or heaters are cold. Inasmuch as these heaters are sometimes arranged adjacent the outer wall of a building and, inasmuch as conduits are often provided so that cold outside air may be delivered to the radiator, operation of the fan when the radiator is cold would result in a cold draft being forced into the building, or the fan would create a cold draft which is also undesirable. Moreover, in hot water systems, or in steam systems in which the drainage is imperfect, it may happen that if the fan starts at a time when there is no heat in a radiator, the water of condensation may be frozen which might result and sometimes does result in cracking of the radiator. Also under these conditions, when thawing takes place, a considerable amount of damage may be done by leaking water.

The main object of the invention is to provide means which will obtain and allow operation of the fan as a result of temperature fluctuations in a room, only when the heater has reached a predetermined temperature. Another object is to provide in conjunction with the above mentioned means, additional means for opening and closing, for example, a radiator valve or equivalent means, for controlling a supply line to the heater and, therefore, heater temperature, accordingly as the heater or heating unit is not or is at the desired temperature.

Features of the invention include the broad idea of controlling the fan of a unit heater in a manner to positively prevent running of the fan when the heater is cold, along with the detailed arrangement of the elements of the apparatus for obtaining the results set forth herein.

The drawing diagrammatically represents the system.

To show one application of the invention, the following construction is illustrated:

The fan motor is indicated at 1 and this motor is supposedly arranged in such relation to a radiator that the fan acts, under normal conditions, to disseminate the heated air. An ordinary type of magnetically controlled valve is shown at 2. 3 is the valve stem and 4 is a coil controlling the valve stem. A relay, sometimes hereinafter referred to as relay No. 1, controls high voltage current to the coil 4 through contacts 5—6. The other relay, hereinafter sometimes referred to as relay No. 2, controls high voltage current to the motor through contacts 8 and 9. The relay coil for relay No. 1 is designated 10 and the relay coil for relay No. 2 is designated 11. The armature for relay No. 1 is designated 12, and the armature for relay No. 2 is designated 13. The armature for relay No. 1 controls current across contacts 16—17, and the armature 13, of relay No. 2, controls the current across the contacts 18—19. When relay No. 1 closes, 5, 6 and 16, 17 make. When relay No. 2 closes, 8, 9 and 18, 19 make.

Conductor 20 connects one side of the motor with the main line and, conductor 21 connects the other side of the motor with contact 8. Conductor 22 connects one side of the main line with one side of the valve coil 4, and conductor 23 connects the other side of the coil with contact 5. Conductor 25 connects the opposite side of the main line with contacts 6 and 9 of the relays. The relay control circuit is operable from the low voltage side of a transformer, the primary side of which is indicated at 30 and the secondary side at 31. One side of the secondary 31 is connected by wire 35 with coils 10 and 11 of the relays. The oppposite side of the secondary 31 is connected by a conductor 36 with contact *w* of the room thermostat, or room device, responsive to control a circuit as a result of temperature fluctuations in a room. The letter *r* represents the bimetallic or other equivalent heat responsive element of a room thermostat. This element is connected by the conductor 38 with the contact 17. The equivalent heat or pressure responsive device such as a hydrostat or pressurestat, located at the radiator, is designated R, and represents a radiator device responsive to control a circuit as a result of temperature fluctuations at the heater. The contacts with which this member cooperates are indicated respectively at W and B. The contacts *b* and W are connected by conductor 40 and, this conductor

is connected with the contact 16 and coil 10 by a conductor 44. Element R of the heater device is connected by conductor 45 with contact 19 and, contact B of the same device is connected by conductor 46 with contact 18 and with coil 11.

Before describing the operation of the device, it is to be known that there are what may be termed three positions of the mechanism. The first may be referred to as the "on" position, in which the room is sufficiently cold, to have obtained opening of the radiator valve, and in which the radiator is sufficiently warm to have obtained a closed circuit to the fan motor. In the "off" position the room is sufficiently warm, the valve is closed, the radiator is sufficiently cold, so that the fan is not running. In the "intermediate" position the room is sufficiently cold, the valve is open, the radiator is cold and the fan will not be running. Thus if the room thermostat closes as a result of a cold room, and if radiator is cold, the fan will stop running, but the valve will be open to furnish heat to the radiator.

It will be noted that in this embodiment of the invention, the room device closes the circuit to the valve when sufficiently cold, while the radiator device closes a circuit to the fan motor when sufficiently hot.

Operation.

Let it be assumed that the apparatus is in "off" position in which the valve is closed and the fan is not running, and both relays are, therefore, open. Under these conditions as the room thermostat cools sufficiently by movement toward the left, relay No. 1 will close when *r*—*b* make, (first by contacting at *r*—*w*, and subsequently at *r*, *b*). The result of these contacts is that the valve opens (contact at *r*, *w* are the holding contacts, and are first to close and last to open). When *r*, *b* make, the circuit is also conditioned to allow passage of current for closing relay No. 2 if and when the hydrostat makes at R, B. The result of this contact at R, B, under these conditions is that the motor starts, because there is a call for heat at the radiator. (Contacts R, W, are the holding contacts and are first to close and last to open. The reverse is true of contacts *r*, *b* and R. B, which close last and open first).

In the "on" position two things may happen: (1)—If the room thermostat breaks at *r*, *w*, due to a sufficiently warm room both relays will open or drop out because the room thermostat dominates control of the circuit to the relay coils. When both relays open, the valve closes and the motor stops. (2)—If the radiator cools while the room thermostat is still sufficiently cool, to maintain contact at *r*, *b*, relay No. 2 will open to shut off the motor. When the steam comes on or when the radiator is sufficiently hot, the hydrostat will make first at R, W, then at R, B, relay No. 2 will pull in or close, and the motor will start. While both relays are closed, *r*, *w* and R, W, constitute the holding contacts. It is to be noted that the room thermostat controls both the valve and the motor circuits, or in other words both relays, while the hydrostat controls only the motor circuit, or relay No. 2 and its control of this motor circuit is subordinate to the room thermostat control. Thus the room thermostat controls the valve, and the making of the motor circuit through relay No. 2.

I claim as my invention:

1. In combination a heater and a fan motor there-adjacent, magnetically operable means for controlling the heater temperature, a device responsive to control a circuit as a result of temperature fluctuations at the heater, a device responsive to control a circuit as the result of temperature fluctuations in the room, a first relay controlled by the room device for in turn controlling the magnetically operable means and also for controlling a power circuit to the room device, a second relay controlled by the room device and by the heater device, said second relay in turn controlling the motor and power circuit to the heater device, and circuit connections for the magnetically operable means, motor, relay, and room and radiator devices, arranged to obtain actuation of said magnetically operable means to supply heat when the room is sufficiently cool.

2. In combination a heater and a fan motor there-adjacent, magnetically operable means for controlling the heater temperature, a device responsive to control a circuit as a result of temperature fluctuations at the heater, a device responsive to control a circuit as a result of temperature fluctuations in the room, a first relay controlled by the room device for in turn controlling the magnetically operable means, and also for controlling a power circuit to the room device, a second relay controlled by the room device and by the heater device, said second relay in turn controlling the motor and power circuit to the heater device, and circuit connections for the magnetically operable means, motor, relay, and room and radiator devices, said connections arranged to start the motor only when the heater is sufficiently warm.

3. In combination a heater and a fan motor there-adjacent, magnetically operable means for controlling the heater temperature, a device responsive to control a circuit as a result of temperature fluctuations at the heater, a device responsive to control a circuit as the result of temperature fluctuations in the room, a first relay controlled by the room device for in turn controlling the magnetically operable means and also for con-

trolling a power circuit to the room device, a second relay controlled by the room device and by the heater device, said second relay in turn controlling the motor and power circuit to the heater device, and circuit connections to the magnetically operable means, motor, relay, and room and radiator devices, said connections arranged to obtain actuation of said magnetically operable means to supply heat when the room is sufficiently cool and further arranged to cause the motor to start only when the heater is sufficiently warm.

4. In combination a heater and a fan motor there-adjacent, magnetically operable means for controlling the heater temperature, a device responsive to control a circuit as a result of temperature fluctuations at the heater, a device responsive to control a circuit as the result of temperature fluctuations in the room, a first relay controlled by the room device for in turn controlling the magnetically operable means and also for controlling a power circuit to the room device, a second relay controlled by the room device and by the heater device, said second relay in turn controlling the motor and power circuit to the heater device, and circuit connections for the magnetically operable means, motor, relay and room and radiator devices, said connections arranged to obtain actuation of said magnetically operable means to supply heat when the room is sufficiently cool and further arranged to cause the motor to start only when the heater is sufficiently warm the arrangement further being such that the room device dominates control by the heater device.

In witness whereof, I have hereunto set my hand this 21st day of April, 1927.

HAROLD W. SWEATT.

MERCOID EXHIBIT WW

Oct. 29, 1929. I. E. McCABE 1,734,015

PRESSURE ACTUATED CIRCUIT CONTROL

Filed Feb. 24, 1922

Fig 1

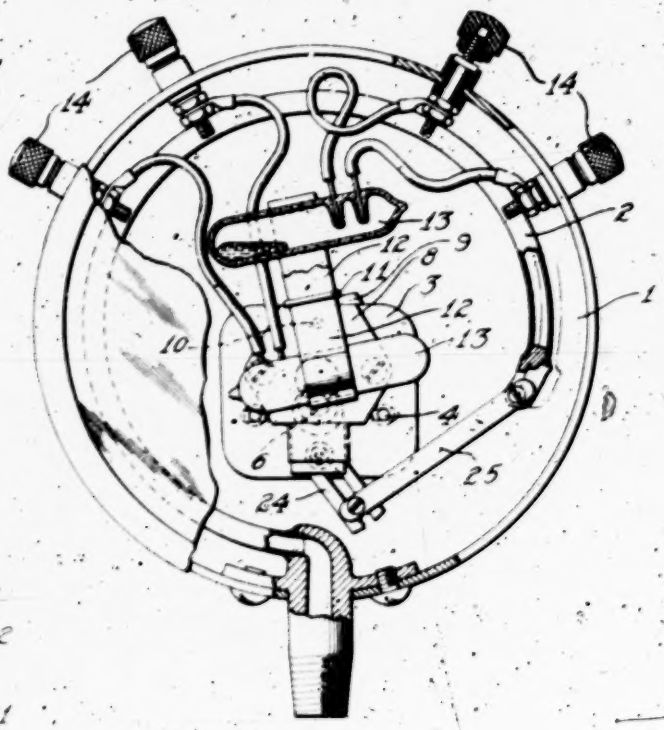


Fig 2

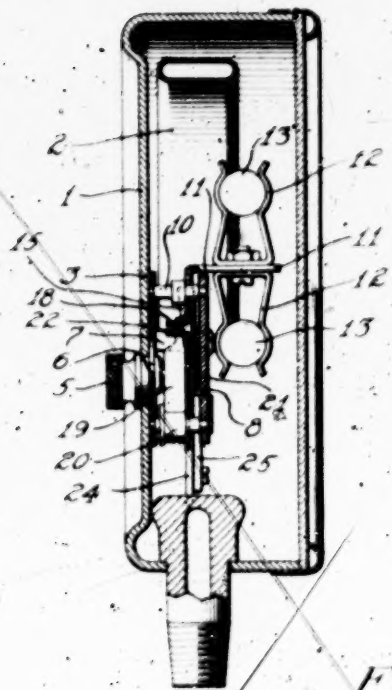


Fig 4

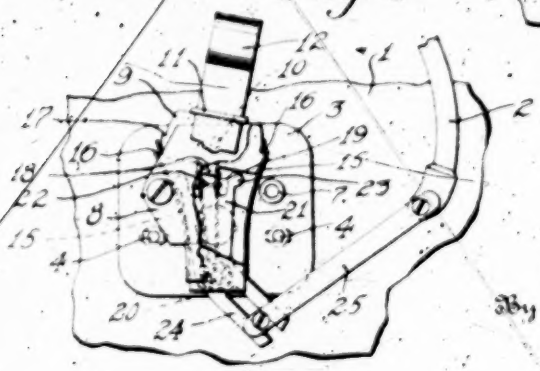
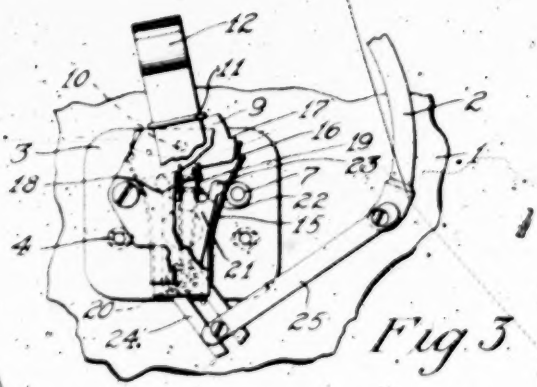


Fig 3



Inventor

Ira E. McCabe

By Langdon Moore

Attorney

Patented Oct. 29, 1929 1,734,015

UNITED STATES PATENT OFFICE

IRA E. McCABE, OF CHICAGO, ILLINOIS

PRESSURE-ACTUATED CIRCUIT CONTROL

Application filed February 24, 1922. Serial No. 538,816.

This invention comprises a pressure actuated circuit control. It is in the nature of a continuation and development of the circuit control device shown in my co-pending application filed February 11, 1922, Serial No. 535,755, Patent #1,662,122, issued March 13, 1928.

It is contemplated among the objects of the invention to associate a pressure responsive device and circuit control carrier in such a manner that when a predetermined pressure has been reached, there will be a quick and positive actuation of the circuit control carrier; wherein the carrier and the parts associated therewith will be maintained in set position, unaffected by vibration up to the point where the device is set to be actuated; wherein there is provided a positive locking of the carrier and the circuit control devices associated therewith at the limits of its movement in two directions; wherein initial movement of the pressure responsive device is utilized to store up tension or force for positive actuation of the circuit control carrier and further movement of the pressure responsive device releases the locking instrumentality and permits the utilization of the stored up force to quickly and positively throw the circuit control devices into another position to be locked there until the action is repeated in inverse direction and manner.

Still further objects are the provision of means for simply and accurately accomplishing the setting of the devices to operate at predetermined degrees of pressure and at predetermined times; the housing of the entire working parts within a small, dust-proof and tamper-proof casing in the nature of a gauge and the use of few parts, mechanically associated so as to effectively accomplish the ends intended.

An embodiment of the invention is shown in the accompanying drawing, the following views being shown:

Fig. 1, is a view in front elevation of one embodiment of the invention, certain portions being broken away and parts being shown in section.

Fig. 2, is a view in vertical section through Fig. 1;

Figs. 3 and 4 are detail fragmentary views showing the parts in their two extreme positions.

In the drawing, a casing 1 is provided with means for connecting it to a source of pressure, and associated with such means there is a pressure responsive instrumentality 2, here shown as an ordinary "Bourdon" tube. Its movements under different degrees of pressure are utilized to actuate a circuit controlling instrumentality which will now be described.

Upon an inner wall of the casing there is mounted a base or plate 3. It is provided with elongated slots 4 and screws, disposed in these slots permit the loosening and freeing of the plate for adjustment within the range of the length of the slots. Means are provided for shifting the plate positively and within minute or almost micrometer range, and as here shown a knurled thumbnut 5 has a portion bearing in the casing wall and an eccentric or offset portion 6 connected to the plate. When the screws in the slots have been loosened, turning of the thumbnut shifts the plate from side to side and this shifting movement is utilized to set the instrumentalities now to be described so that they will operate at predetermined times and after a predetermined pressure has been set up in the pressure responsive device. When the desired setting is accomplished the screws are utilized to lock the plate and the devices carried thereby, in set position.

Mounted upon base 3, there are posts or spacers 7 which carry a second plate 8, in spaced relation to the first plate and secured suitably to the posts as by screws. These two plates and their connections constitute a housing and carrier for the moving parts of

the circuit controlling devices and they move as a unit when being adjusted.

Means are provided for carrying circuit controlling devices and for permitting the movement of these devices to effect actuation of the circuit control. As here shown, such means include a circuit controlling, carrying, or actuating device having a body portion 9, mounted for oscillating movement on a stem or shaft 10, which, in turn has bearings in the front and back plates respectively. At one end of the body portion there is an extension, arm, or support 11, arranged in angular relation to the body portion and extending outwardly therefrom. It constitutes a support or carrier for circuit controlling device retainers 12, here shown in the form of clips into the resilient arms of which circuit controlling devices 13 may be slipped and securely retained. As here shown these circuit controlling devices comprise a closed tube within which there are terminals of an electric circuit which is opened or closed by a drop of mercury. As shown in Fig. 1, there are two carriers in the present embodiment the poles of each being at opposite sides of the tubes, that is, one set of terminals will be to the right and the other to the left. These are connected suitably to binding posts 14, to which may be connected any desired instrumentalities which the circuit controlling devices are to govern. A large variety of uses is accommodated by this arrangement, as various forms of circuit controlling devices may be inserted in the carriers, and by arranging the terminals in different positions a large range of uses is possible. In the present embodiment, when the carriers are in the position as shown in Fig. 1, the upper circuit control device is in open position and the lower one is closed. Movement of the carriers in the opposite direction from that shown will effect just the opposite result.

Means are provided for effecting this movement of the carriers under the influence of the pressure responsive device, and for effecting it in a quick and positive manner after a predetermined pressure has been reached. Associated with such means there are means for locking the carriers at the limits of their movement in each direction, for storing up force which is to swing the carriers and for releasing the locking means to permit swinging movement of the carriers.

Upon an extended portion of the top plate 8, are resilient arms 15, the free ends of which bear against opposite sides of the circuit actuating device 9. These arms are provided with hooked portions 16 adapted to engage and securely hold, until forced therefrom, a notched portion 17 in the side of the member 9. The normal pressure of the arms is inwardly, so that at the end of its oscillating movement in either direction, member 9 is locked by the hooked portion 16 on one of the arms engaging notch 17 on the member.

Extending inwardly, at an angle to the body of member 9, there is a second arm or extension 18, and engaging opposite edges of this arm there are resilient members 19, which are mounted on a stem or shaft 20, the latter having a bearing rotatively in the front and back plates. This shaft also carries a combined lever and trip mechanism having a body portion 21, mounted intermediate its ends on stem 20 and capable of being oscillated on this point as a pivot. At one end of body portion 21, there is an inwardly extending arm 22 placed between the free ends of resilient members 19. These resilient members are arranged so that their free ends press towards each other and when arm 22 is moved towards the right in Fig. 4, for instance, pressure will be built up in the left hand resilient member at the point where it engages arm 18 on the circuit actuating member 9 and this force or pressure is utilized to quickly and positively throw member 9 to the limit of its movement, under the exertion of this pressure when the locking means are released. For releasing the locking means, there are oppositely disposed rounded extensions 23 carried by the trip mechanism 21 and placed to engage the inner portion of each resilient arm 15 so as to force the hooked portion 16 of the arm out of notch 17 and permit member 9 to swing under the influence of the pressure or tension built up and existing between arm 18 and spring member 19.

Extending outwardly from the body portion 21 there is a slotted arm 24, coacting with which there is a link 25 which is connected to the free end of the pressure responsive device 2. The connection is effected by an adjustable screw movable in the slot in the arm and provides a secondary means of adjusting the sweep of the pressure responisve device and its action on the circuit controlling devices.

With the parts in the position shown in Fig. 3, movement of the free end of the pressure responsive device to the right, will be communicated to link 25. This will swing member 21 on its pivot and its upper portion will be pressed towards the left. During this movement, right hand resilient member 19 will be exerting pressure against the edge of arm 18 and this will continue until the left hand rounded extension 23 on member 21, engages the inner portion of the left hand spring latch or resilient arm 15, whereupon the latch will be forced from the notch and member 9 will be quickly and forcibly swung towards the right, or to the position shown in Fig. 4. In connection with this movement,

the upper circuit will be closed and the lower one opened as best seen in Fig. 1.

The invention provides a simple and effective means for positively actuating a circuit controlling device especially where there is considerable vibration and where it is desirable to maintain the devices in a fixed position until a predetermined degree of pressure has been reached. While it has been illustrated in the present embodiment, it is understood that I do not wish to be limited to the precise form of this disclosure as many changes in the general structure and arrangement of the parts are considered to be within the scope of the invention as set forth in the claims.

What I claim is:-

1. The combination of a liquid contact circuit controlling device having the contacts thereof enclosed in a sealed tube, a carrier therefor including an arm mounted for oscillatory movement; a rotatable shaft; a spring member operatively associated with the arm and mounted upon said shaft; means for swinging the arm through the medium of the spring member upon rotation of said shaft; means for locking the arm in swung position; said means including a member extending from the arm; a latch operatively associated therewith; means for rotating the shaft for building up resistance between the spring and arm; and means for releasing the latch to allow the built-up resistance to snap the contact tube from the end of movement in one direction to the end of movement in the opposite direction when the resistance has reached a predetermined limit.

2. In a pressure actuated circuit controller, a casing; a plate mounted therein, a liquid contact circuit controlling carrier mounted for oscillatory movement on the plate; a member operatively associated with the carrier and having a portion extending outwardly therefrom; a spring operatively associated with the member; a carrier for the spring rotatively mounted upon said plate; and pressure actuated means for rotating the spring carrier, and through the spring moving the circuit control carrier.

3. In a pressure actuated circuit controller, a casing; a plate mounted therein, a liquid contact circuit controlling carrier mounted for oscillatory movement on the plate; a member operatively associated with the carrier and having a portion extending outwardly therefrom; a spring operatively associated with the member; a carrier for the spring, rotatively mounted for rotative movement; means for rotating the spring carrier and through the spring, moving the circuit control carrier; said means including a pressure responsive device; and mechanism connecting the pressure responsive device and spring carrier.

4. In a pressure actuated circuit controller, a casing; a plate mounted therein, a liquid contact circuit controlling carrier mounted for oscillatory movement on the plate; a member operatively associated with the carrier and having a portion extending outwardly therefrom; a spring operatively associated with the member; a carrier for the spring, mounted upon said plate for rotative pressure actuated movement; means for rotating the spring carrier and through the spring, moving the circuit control carrier; and means for locking the circuit control carrier in thrown position.

5. In a pressure actuated circuit controller, a casing; a plate mounted therein, a liquid contact circuit controlling carrier mounted for oscillatory movement on the plate; a member operatively associated with the carrier and having a portion extending outwardly therefrom; a spring operatively associated with the member; a carrier for the spring, mounted upon said plate for rotative movement; pressure actuated means for rotating the spring carrier and through the spring, moving the circuit control carrier; means for locking the circuit control carrier in thrown position; and means for releasing the lock.

6. In a pressure actuated circuit controller, a pressure responsive device, a circuit controlling device including a pivoted liquid contact carrier and a rotatable shaft mounting a resilient actuator for the carrier operatively associated with the pressure responsive device, said carrier and shaft mounted upon a support and means for bodily moving the support with relation to the pressure responsive device to effect adjustment of said devices to regulate the operation thereof.

7. In a pressure actuated circuit controller, a casing, a pressure responsive device, a circuit controlling device including a pivoted liquid contact carrier and a rotatable shaft mounting a resilient actuator for the carrier operatively associated with the pressure responsive device, said carrier pivot and shaft carried upon a support mounted for bodily movement upon the casing and means for bodily moving the circuit controlling device in relation to the pressure responsive device including a manually rotatable member mounted on the casing having an eccentric connection to the support.

8. A fluid pressure operated liquid contact snap switch including a pressure responsive device, a liquid contact switch having the terminals enclosed in a sealed tube, a carrier for the contact tube including an arm mounted for oscillating movement, a rotating shaft, a spring member operatively associated with the arm and mounted upon said shaft, means actuated by the pressure responsive device for rotating the shaft and building up tension in the spring, means co-acting with the carrier plate for holding the same at the ends of oscillation as tension is being built up in the

spring and means associated with the spring tensioning means thereafter releasing the carrier plate and subjecting it to the built up tension to snap the contact tube to the other end of the oscillation of the carrier plate.

9. A fluid pressure operated liquid contact snap switch including a pressure responsive device, a liquid contact switch having the terminals enclosed in a sealed tube, means associated therewith actuated by the pressure responsive device to project the contact tube with a positive sudden and continuous movement from one position to another insuring a quick make or break of the switch circuit at each predetermined movement of the pressure responsive device, and additional means for bodily moving the tube projecting means in relation to the pressure responsive device for adjusting the operation thereof to actuate the switch at various predetermined pressures.

10. In combination, a pressure actuated circuit controller comprising a tilting mercury tube switch, a pressure responsive means for tilting said switch, means to maintain said switch in predetermined open or closed positions, and a quick throw mechanism whereby in response to predetermined changes in pressure the switch is tilted from one predetermined position to the other.

11. In combination, a pressure actuated circuit controller comprising pressure responsive actuating means, an enclosed liquid contact opening and closing device, a mounting therefor adapted to assume one or the other of two predetermined positions, and means responsive to predetermined changes in pressure to positively position said mounting in either of said predetermined positions.

12. In combination, a pressure actuated circuit controller comprising pressure responsive actuating means, a tilting enclosed liquid contact opening and closing device, a mounting therefor adapted to assume one or the other of two predetermined positions to open or close the circuit, means responsive to predetermined changes in pressure to positively position said mounting in either of said positions, and means for adjusting the pressures at which such changes in position of the liquid contact device shall occur.

13. In combination, a pressure actuated circuit controller comprising a pressure responsive actuating means, a tilting mercury switch, means for supporting said switch, means for tilting said switch to either predetermined closed or open position, together with means for maintaining said switch in either position until a predetermined change in pressure is reached when it is immediately tilted to the opposite position.

14. A pressure actuated circuit controller comprising a Bourdon tube, a tilting mercury switch, a snap action mechanism mounting said switch and means operatively associated therewith actuated by movement of the Bourdon tube at predetermined pressures to operate the snap action mechanism to tilt the mercury switch from open to closed position and maintain it in that position or vice versa.

15. A pressure actuated circuit controller comprising a Bourdon tube, a tilting mercury switch, a snap action mechanism mounting said switch and means operatively associated therewith actuated by movement of the Bourdon tube at predetermined pressures to operate the snap action mechanism to tilt the mercury switch from open to closed position and maintain it in that position or vice versa, together with means for adjusting the pressures at which the tilting shall occur.

16. In combination, a circuit controller comprising a pressure responsive actuating means, one or more tilting liquid contact switches, a mounting therefor adapted to assume one or the other of two predetermined positions, and mechanism for storing up the energy produced by the changes in pressure of the pressure responsive means and releasing it at predetermined pressures to positively position said switches in either of said two positions in response to predetermined changes in pressure.

17. In combination, a circuit controller comprising a pressure responsive actuating means, one or more tilting liquid contact switches, a mounting therefor adapted to assume one or the other of two predetermined positions, and mechanism for storing up the energy produced by the changes in pressure of the pressure responsive means and releasing it at predetermined pressures to positively position said switches in either of said two positions in response to predetermined changes in pressure, together with means for adjusting the pressures at which such tilting of the said switches shall occur.

18. In combination, a circuit controller comprising a pressure responsive actuating means, one or more fluid contact switches, a mounting therefor tiltable to each of two predetermined positions, means operatively associated with the actuating means for tilting the switches from one position to the other at predetermined pressures to make or break the circuits controlled thereby irrespective of changes from the vertical.

19. In combination, a pressure actuated circuit controller comprising a fluid contact switch, a mounting therefor tiltable to either of two predetermined positions, whereby in one position the circuit is open and in the other the circuit is closed, and means coacting therewith to place the switch in either position in response to predetermined pressures irrespective of such variation from the vertical position of the controller as will normally permit the circuit to remain open or

closed in the switch until tilted by predetermined pressures.

20. In a circuit controller, a pressure responsive actuating member, a tilting fluid contact switch, a mounting therefor tiltable to either of two predetermined positions at a greater tilt than required to operate the switch, and means coacting therewith to place the switch in either position in response to predetermined pressures and permit the circuit controller to be varied from the normal position in proportion to the excess tilt provided and permit within these limits the normal operation of the switch at the predetermined pressures.

In testimony whereof I affix my signature.

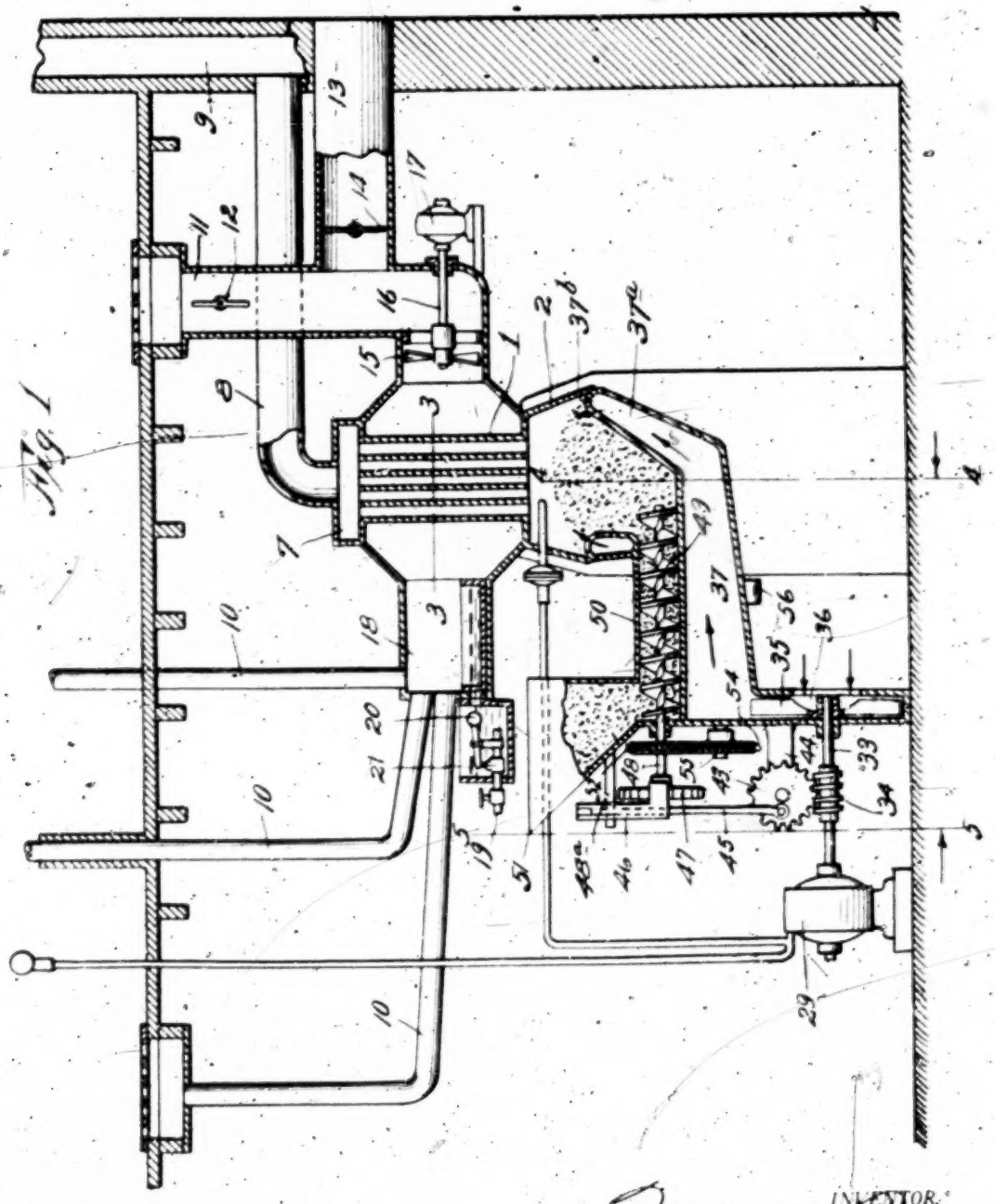
IRA E. McCABE.

MERCOID EXHIBIT XXX-3

May 13, 1930. W. M. CROSS 1,758,146

DOMESTIC HEATING SYSTEM

Filed Nov. 11, 1926 3 Sheets-Sheet 1



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DOMESTIC HEATING SYSTEM

Filed Nov 11, 1926 3 Sheets-Sheet 2

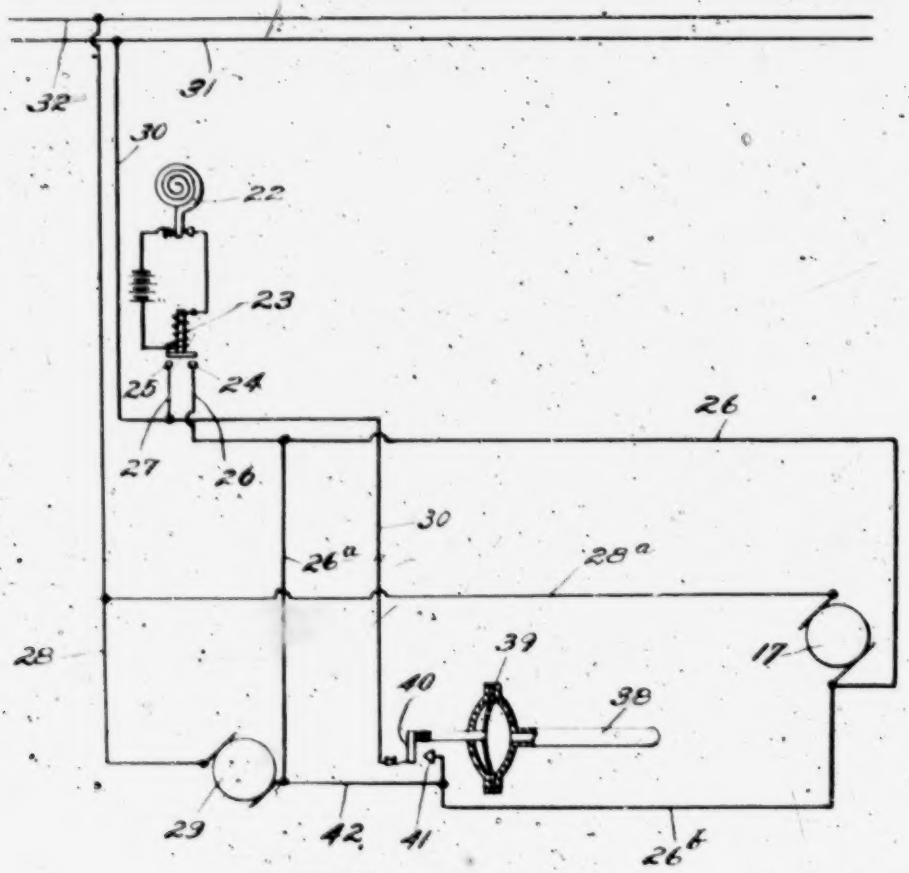


Fig. 2

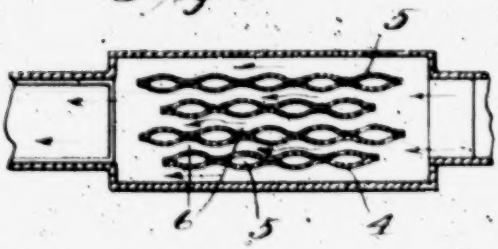


Fig 3

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DOMESTIC HEATING SYSTEM

Filed Nov 11, 1926 3 Sheets-Sheet 3

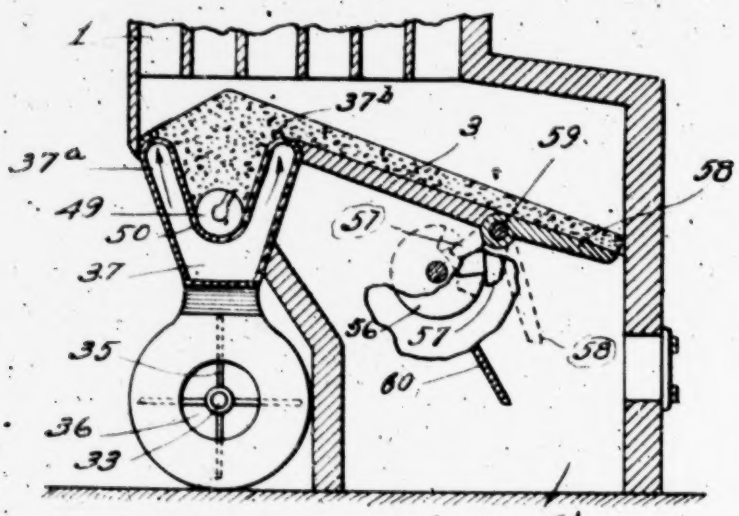


Fig 4

Fig 5

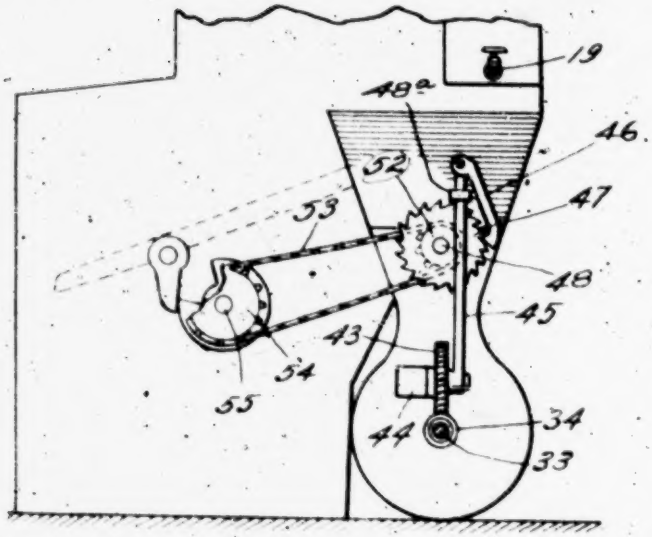
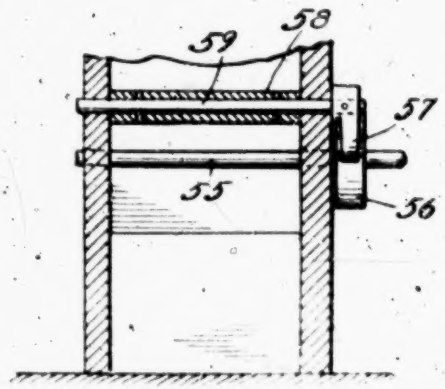


Fig 6



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Patented May 13, 1930 1,758,146

UNITED STATES PATENT OFFICE

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DOMESTIC HEATING SYSTEM

Application filed November 11, 1926. Serial No. 147,667.

This invention relates to improvements in domestic heating systems, and refers more particularly to a hot air system of heating in which the combustion gases passing to the flue are reduced in temperature in their passage through a heat exchanging device below the kindling temperature of wood.

Among the particular objects of the invention are to provide a system having a furnace into which is mechanically and automatically fed a comminuted fuel, such as disintegrated coal, the fuel being underfed into the combustion pot, and overflowing onto an inclined grate, the grate terminating in automatic intermittently operated dumping device, whereby the ashes are removed from the grate and dumped directly into an ashpit; to provide a system which is automatically controlled by a dual system of control, one phase of the system operating the fuel feed and a force draft mechanism by variations in the room temperature of the dwelling, the other control functioning the fuel feed and force draft by predetermined minimum temperatures in the furnace or combustion pot, and in general to provide a system hereinafter described in more detail and incorporating a number of well known advantages of the modern type of heating system.

Fig. 1 is a diagrammatic side elevational view of a portion of the system, the furnace mechanism and its controls being shown in section, while the distributing pipes have been partially or totally eliminated for simplicity.

Fig. 2 is a detail view of the electrical control system.

Fig. 3 is a sectional view taken along the line 3—3 in Fig. 1, looking in the direction of the arrow.

Fig. 4 is a view taken along the line 4—4 in Fig. 1, looking in the direction of the arrow.

Fig. 5 is a view taken along the line 5—5 in Fig. 1, looking in the direction of the arrow, and

Fig. 6 is a fragmentary detail of a portion of the drive mechanism.

Referring to the drawings, at 1 is shown a heat exchanging device above a furnace comprising a combustion pot 2 and an inclined grate 3.

The heat exchanger consists in a plurality of corrugated sheets welded, or otherwise fastened together in pairs to produce a construction shown best in cross section in Fig. 3; these pairs of sheets are designated by the numeral 4 in Fig. 3, the tubular passageways produced by the pairing of the corrugated sheets are designated as 5, while the sinuous annular spaces between the elements 4 are designated as 6. The gases of combustion produced by the burning of fuel pass through the tubular passageways 5 and out through a top header 7 to the flue 8, and thence into the chimney 9.

The air which is heated and distributed through the pipe leads or distributing pipes 10 is supplied either through the return duct 11 controlled by a damper 12 or through an outside air inlet duct 13 regulated by a damper 14. A fan 15 mounted upon a shaft 16 and supported within the duct 11 is driven by a motor 17, the shaft of the motor carrying the fan being supported in suitable bearings in the duct. The purpose of the fan is to produce a positive circulation of the air through the system. This air, which is driven by the fan, is directed through an annular passageways 6 where it is heated, due to the fact that it brought in radiating contact with the highly heated outer surfaces of the tubular passageways 5 through which the combustion gases pass. On discharge from the heat exchanger the heated air passes through a humidifying chamber 18, in which is maintained a pool of water by a supply pipe 19, automatically controlled by a liquid level float 20, and valve 21, the control maintaining a constant water level in the humidifying chamber. After being humidified the heated air is directed through the respective distributing pipes or ducts 10, to the separate rooms of the dwelling, not shown in the drawings.

Referring now to the control which is detailed in Fig. 2. At 22 is a thermostat which controls the operation of the switch 23. 24 and 25 are contact points which are terminals of the lines 26 and 27 respectively. When the

temperature in the dwelling drops below the point at which the thermostat is set, the switch 23 is functioned, at which time the circuit is completed through the lines 26, 28ª and 28, and 26, 26ª and 28, starting the motors 17 and 29. The line 27 is connected by a line 30 to the power line 31, while the line 28 into which is connected the line 28ª has connection with the power line 32. When the circuit is closed and the motor 29 started the shaft 33, carrying the worm 34 and fan 35 is rotated, the fan drawing the air through an inlet duct 36 and discharging it through the ducts 37 into the open channels 37ª formed around the combustion pot 2, similar to an air jacket. The air is discharged from this jacket, or chamber, surrounding the combustion pot, through tuyères or openings 37ᵇ in the inner sides of the combustion pot near the surface of the burning fuel, or at a point substantially where the combustion takes place. To prevent the fire from being entirely extinguished during the periods when the system is shut off for any considerable length of time, a thermo-couple 38, shown in Figs. 1 and 2, is positioned in the combustion space of the furnace, just above the fire zone, and this thermo-couple is set at a predetermined temperature which temperature is regulated to operate the fuel feed and force drafts sufficiently to prevent total extinguishment of the fire. The variations in temperature acting upon the thermo-couple function a diaphragm valve 29 to bring a contacting surface 40 in engagement with the contact point 41 when the temperature in the furnace is reduced to a predetermined point. With the contacting of the elements 40 and 41, the electrical circuit is closed through the lines 30, 42 and 28, and 30, 26ᵇ, 28ª, and 28 to start the motors 17 and 29 as they were started by the thermostat. The fire is continued until the furnace temperature is raised sufficiently high to break the contact between 40 and 41, shutting off the motors 17 and 29, which drive the fuel feed and force draft and the air circulation through the system.

Referring now to the drive for the fuel feed mechanism, the worm 34 meshes with a worm wheel 43, the latter being supported by a hanger 44. The lower end of the crank 45 is connected to the face of the worm wheel and is given a reciprocating movement, due to its offset position from the center of the wheel. This reciprocating movement is transferred to a dog 46, which engages the teeth of a ratchet wheel 47, the latter being mounted upon a shaft 48. The vertical reciprocating crank 45 slides in an upper guide member 48ª which prevents also displacement of the dog from the ratchet. Upon the shaft 48 is also mounted a conveyor screw, 49 operating in a pipe 50 which serves as a conveying duct between the hopper 51 and the combustion pot 2. The rotation of the conveyor screw transfers the fuel from the hopper to the combustion pot where it is underfed to the combustion pot. A sprocket wheel 52 is also mounted upon the shaft 48, and drives the chain 53 which runs over a sprocket 54 mounted upon a shaft 55. This shaft 55 also carries a cam wheel 56 which has a portion of its outer surfaces cut away. The outer surface of the cam 56 rides against a depending tongue 57 of the dump grate 58, which is positioned at the end of the inclined grate 33. Through a considerable part of the rotation of the cam the dump grate is held in the full line position shown in Fig. 4, but when the cut out portion is rotated so that the depending tongue can swing into a position shown in the dotted line position in Fig. 4, the grate being pivoted at 59 drops down, permitting the ashes or spent fuel gravitating along the inclined grate 3 to drop into the hopper 60 and thence into the ash-pit 61 below the furnace.

It is recognized to be common practice to circulate air through a furnace by means of a blower fan, and also to humidify this air prior to its distribution. It is recognized as common practice also to automatically stoke a furnace by means of a conveyor screw but to supply the fuel by an under feed device, and to inject the air substantially at the combustion point in the furnace and to allow the overflowing burning fuel from the combustion pot to gravitate downwardly over an inclined grate and at the end of this grate to automatically and intermittently dump the ashes into a pit, is thought to be a practice which is novel in the art.

Further more the dual electrical control apparatus—one control regulated by the variations in room temperature in the dwelling and a separate control operating simultaneously therewith functioned by a predetermined minimum temperature in the combustion zone of the furnace, constitutes another feature of the invention.

The fuel which is used is consumed always under the most economical conditions, as the system is either turned on full or entirely off, so that the most efficient operating conditions exist for combustion; or the system is what may be termed as in a smoldering or banked condition. There is no regulation of drafts as in the common type of hot air furnace, making for operation under varying conditions, none of which are perhaps economically proper and efficient for the fuel which is being used.

By this invention then, economical conditions of combustion are at all times enforced, for when the thermostat in the heated room reaches a predetermined temperature, there is a complete stoppage of the fuel feed mechanism and the forced draft fan. This permits then only the burning of the residual

fuel which when consumed would allow the fire to be entirely extinguished if it were not for the auxiliary control within the combustion pot, which functions when the furnace is cooled to say 200° F. This auxiliary control starting the fuel feed and force draft again institutes maximum operation until the temperature in the combustion pot is restored to 200° F., or at any other predetermined temperature selected for the minimum temperature of the furnace.

It may, under certain conditions, be desirable to have the auxiliary control or the control functioned by the furnace temperature connected only to the fuel feed and force draft, so that the air circulation or the operation of the fan 17 is dispensed with when the system is being operated to maintain the minimum furnace temperature.

In the construction of the heat exchanger 1, the relation of heating surface to fuel burned is at least that of 200 square foot surface per 1000 B. t. u. produced per minute. When this relation is used the stacked temperature is approximately 150° F. (a temperature well below the kindling temperature of soot or wood).

This mechanism then for the first time supplies a system in which under maximum operating conditions the stack temperatures are still below a temperature sufficiently high to burn or ignite wood or soot, and will at all times range below 250° F.

It is a well known fact that a large portion of the fires in domestic dwellings are occasioned by overheating of chimneys or flues connecting with the chimneys; a condition occasioned by high stack temperatures. By the use of the present invention these excessive stack temperatures would be impossible, as it would be impossible to operate the system so that the stack temperatures would rise above the kindling temperature of wood, as previously stated—this being due to the efficient heat exchange taken place between the combustion gases and circulating air. The relation then of the maximum combustion measured in B. t. u. units to the heating exchanging surface is such that the products of combustion are pooled to a temperature below the kindling temperature of wood or soot.

The system in combination with automatic stoker regulated simultaneously by a dual or double thermostatic control, which prevents the extinguishment of the fire and maintains a proper room temperature, comprises briefly the features of the system.

The furnace construction relies for its novelty upon underfeeding of a granulated or disintegrated fuel to a combustion pot and supplying air at substantially the combustion point; also, in the distributing of this overflowing burning fuel onto an inclined grate and automatically and intermittently dumping the ashes to a pit provided for that purpose.

I claim as my invention:

1. A heating system comprising a combustion pot, means for feeding fuel thereto, a combustion space above the combustion pot, means controlled by the temperature of the rooms to be heated for automatically regulating the fuel feeding means, and a separate thermostatic control actuated by predetermined minimum temperatures in said combustion space for preventing extinguishment of the fire when operating under low heat requirement conditions.

2. A heating system comprising a combustion pot, means for feeding fuel thereto, a combustion space above the combustion pot, means controlled by the temperature of the rooms to be heated for turning on and off the feeding means, and a separate thermostatic control actuated by a predetermined minimum temperature in said combustion space for preventing extinguishment of the fire when operating under low heat requirement conditions.

3. A heating system of the character described comprising a combustion pot, means for feeding fuel thereto, means for forcing air to said combustion pot, means controlled by the temperature of the rooms to be heated for automatically turning on and off the fuel feeding means and the air forcing means, a combustion space heated by said combustion pot and a separate thermostatic control actuated by a predetermined minimum temperature in the combustion space for preventing extinguishment of the fire when operating under low heat requirement conditions.

4. A domestic heating plant of the character described comprising a combustion pot, an automatic stoker adapted to supply fuel thereto, means controlled by the temperature of the rooms to be heated for turning on and off the stoker, and a separate thermostatic control actuated by the predetermined minimum temperature of the combustion space for preventing extinguishment of the fire when operating under low heat requirement conditions.

5. A force draft furnace for a heating system having a power driven underfeed stoking element, a dual thermostatic control mechanism connected to the stoker driving means, one thermostat mechanism functioning by variations of the temperature in the space to be heated, and the other by predetermined minimum temperature within the furnace to prevent extinguishment of the fire.

WALTER M. CROSS.

MERCOID EXHIBIT ZZ

Aug. 4, 1931. I. E. McCABE 1,817,634

PRESSURE ACTUATED SWITCH OPERATING DEVICE

Filed April 26, 1928 4 Sheets-Sheet 1

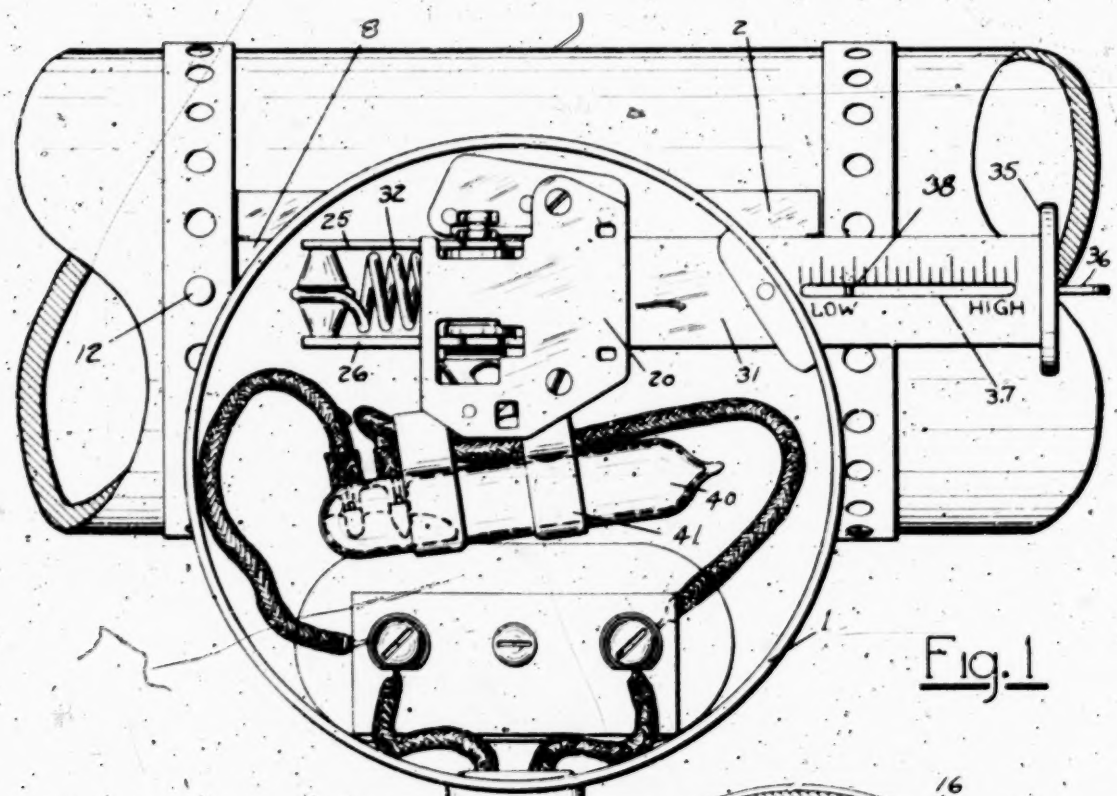


Fig. 1

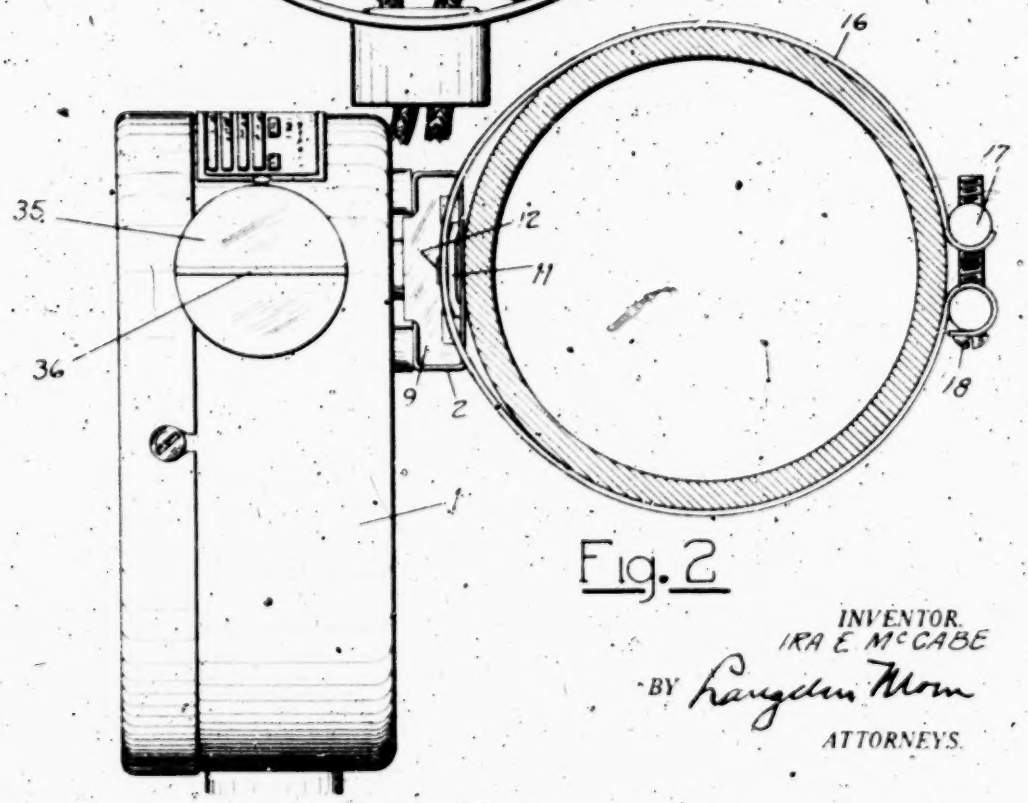


Fig. 2

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PRESSURE ACTUATED SWITCH OPERATING DEVICE

Filed April 26, 1928 4 Sheets-Sheet 2

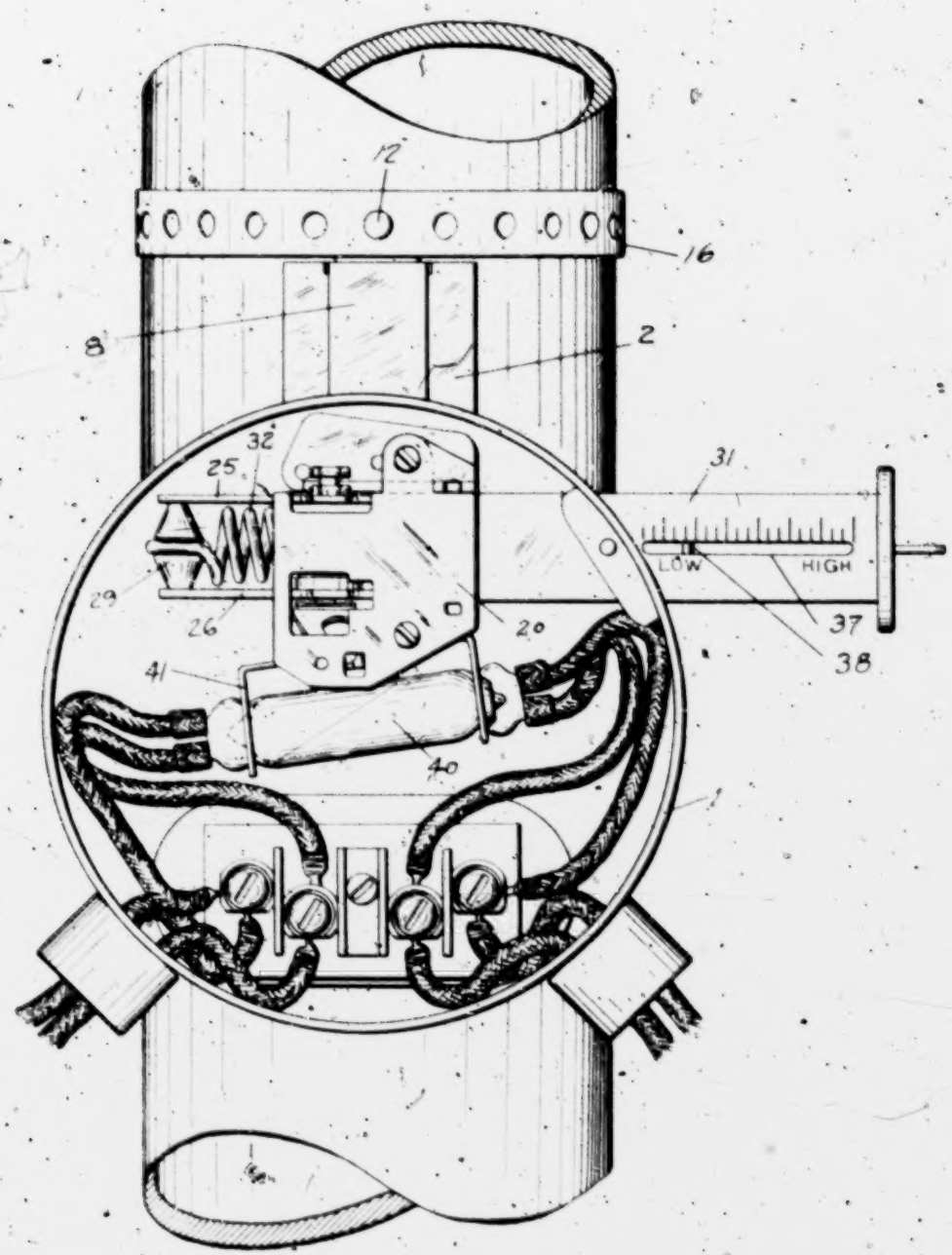


Fig. 3

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PRESSURE ACTUATED SWITCH OPERATING DEVICE

Filed April 26, 1928 4 Sheets-Sheet 3

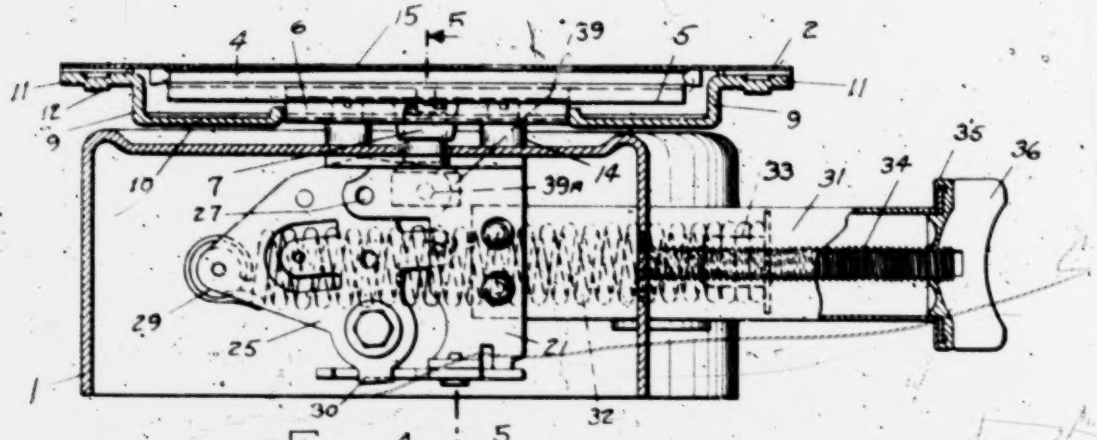


Fig. 4

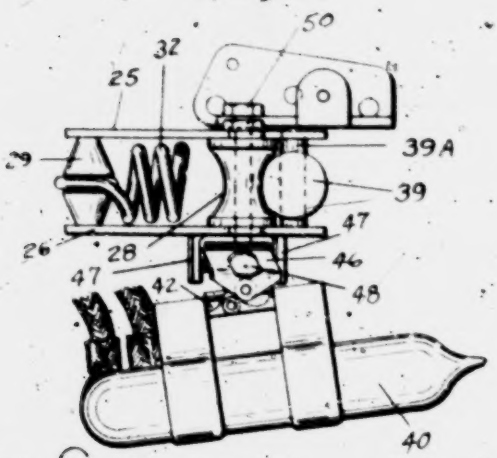


Fig. 6

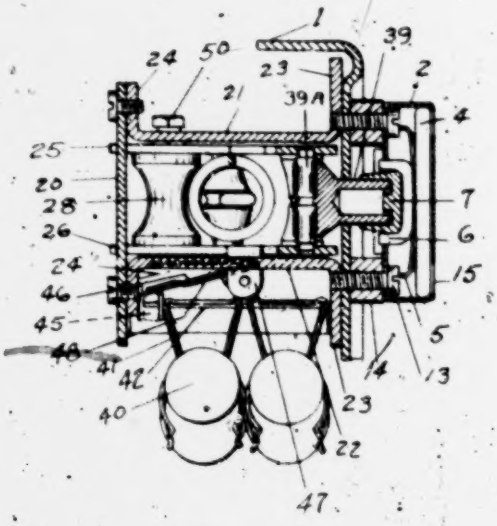


Fig. 5

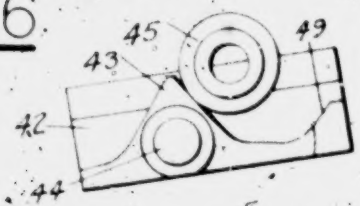


Fig. 7

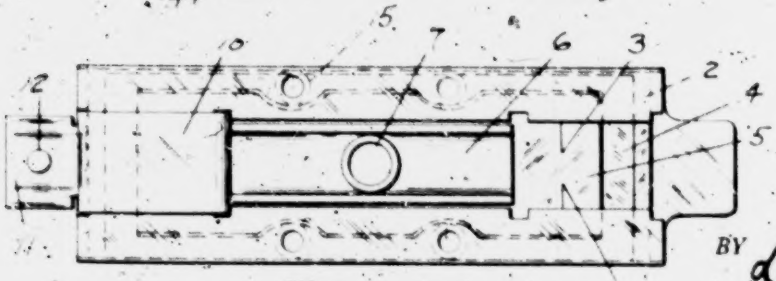


Fig. 14

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Aug. 4, 1931. I. E. McCABE 1,817,634

PRESSURE ACTUATED SWITCH OPERATING DEVICE

Filed April 26, 1928 4 Sheets-Sheet 4

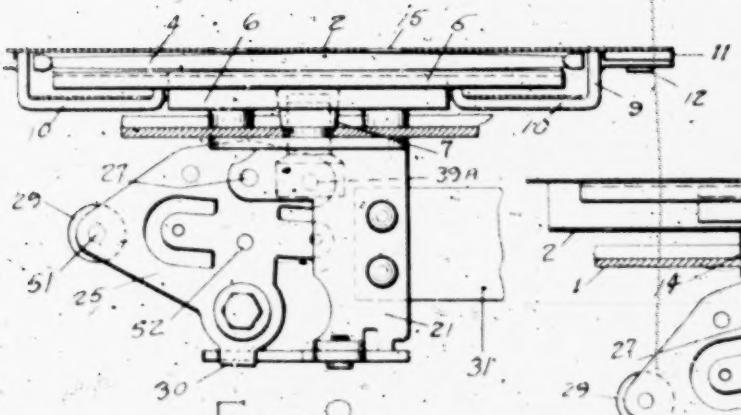


Fig. 8

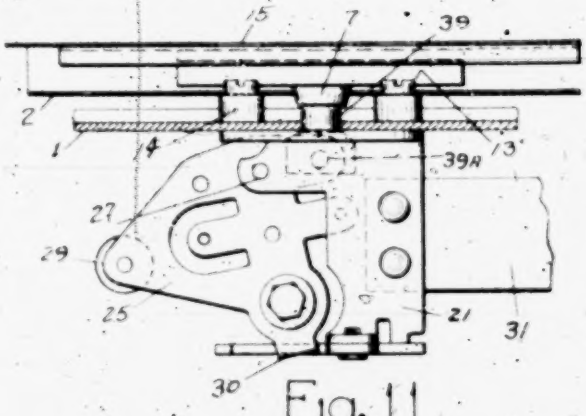


Fig. 11

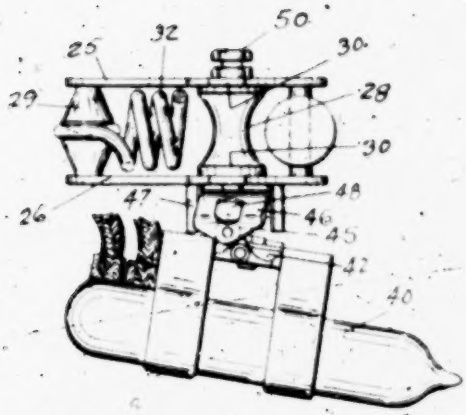


Fig. 9

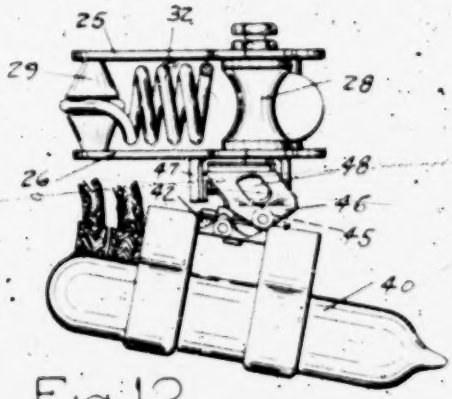


Fig. 12

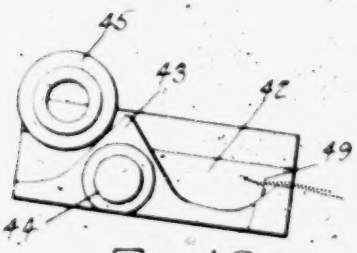


Fig. 10

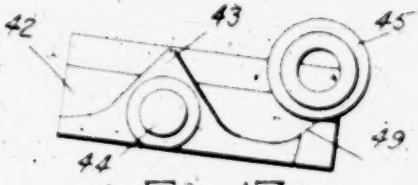


Fig. 13

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Patented Aug. 4, 1931 1,817,634

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UNITED STATES PATENT OFFICE

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PRESSURE ACTUATED SWITCH OPERATING DEVICE

Application filed April 26, 1928. Serial No. 272,886.

This invention relates to improvements in pressure actuated mechanism for operating electric switches and more particularly to electric switch operating mechanism provided with an expansible and contractible actuating element whereby changes in the temperature of said element operates the switch and means for attaching said mechanism to a body the temperature of which controls the operation of said switch.

It is an object of this invention to provide in an electric circuit which controls the operation of mechanism for producing changes in temperature, such as electrically operated oil burning or refrigerating machines, a switch which will be actuated by predetermined changes in the temperature produced by said mechanisms to close or break said controlling circuit.

One of the many uses of this invention is its application to control an electrically operated oil burner as installed in connection with a hot water domestic heating system. Devices for this purpose have heretofore been employed having a thermostatic member adapted to be actuated by contact with the water and have necessitated a hole being drilled in the boiler wall for the insertion of the thermostatic member and thereafter the provision of a water tight packing and joint. One of the most obvious advantages of the present invention is that the device may be readily applied to the exterior of the boiler or to the pipe through which the heated water rises from the boiler, to enter the heating system, commonly called the riser, and by the improved attaching means whereby it may be clamped on to the riser, whether it be vertical or horizontal both of which being usual commercial constructions, with the switch operating mechanism in operative position and control the burner circuit in the same manner as if directly in contact with the hot water. It is felt that a description of this particular application will be a sufficient disclosure to others skilled in the art to apply the same to the other uses to which it is adaptable.

In describing this embodiment of this invention reference is made to the accompanying sheets of drawings, with the understanding that minor detail changes may be made therefrom without departing from the scope of the invention.

In the drawings:

Figure 1 is a view in front elevation of this improved device as attached to a horizontal pipe or riser of a hot water heating system, with the front of the casing removed.

Figure 2 is a view in end elevation of Figure 1.

Figure 3 is a view similar to Figure 1 in which the device is attached to a vertical pipe or riser.

Figure 4 is a top plan view of Figure 1 in which the switch casing is shown in section as well as the actuating casing.

Figure 5 is a detail view in vertical transverse section taken through the operating and actuating mechanism on the line 55, Figure 4.

Figure 6 is a detail view in front elevation of the operating mechanism with the front plate removed.

Figure 7 is an enlarged detail view in front elevation of a part of the switch operating mechanism.

Figure 8 is a detail fragmentary plan view of the actuating and operating mechanisms, with the casings of each in section, showing the relation of the parts when the temperature has increased sufficiently to actuate the mechanism to throw the switch to break the electrical circuit.

Figure 9 is a detail view in front elevation, with the front plate and casing removed illustrating the relation of the parts when in the position shown in Figure 8.

Figure 10 is an enlarged detail view in front elevation showing the relation of parts of the operating mechanism when in the position shown in Figure 9.

Figures 11, 12 and 13 are views similar to Figures 8, 9 and 10 showing the position assumed by the various parts of the operating mechanism should the actuating mechanism fail or become inoperative by destruction of the power element.

Figure 14 is a plan view of the actuating

mechanism casing removed from the operating mechanism casing looking at that part which engages the latter casing, with one end cap removed.

As shown in Figures 1, 2 and 3, the switch operating mechanism is enclosed with a cylindrical casing 1 and the actuating device therefor within a flat oblong casing 2. The actuating mechanism casing 2 is preferably formed of thin resilient metal and is rectangular in transverse section, as shown in Figure 5. The side adapted to be secured adjacent the rear wall of the cylindrical switch casing 1 is provided with a longitudinal opening 3, Figure 14, extending throughout its length and the opposite side is provided with an extension at each end approximately the same width as the said longitudinal opening. The actuating or power element comprises an elongated flat thin metallic capsule 4 hermetically sealed and containing a fluid readily responsive to changes in temperature to cause the flat sides to expand and contract, as more fully described in the applicant's copending application Serial No. 228,258 filed Oct. 24, 1927.

One flat side of the capsule 4 rests upon the exterior side of the casing and a follower plate 5 is arranged between the other flat side and slotted side of the casing adjacent the switch casing. This follower plate 5 is of slightly less length and width than the capsule and slides readily within the casing. An elongated guide member 6 is secured centrally upon the follower plate to extend upwardly through the longitudinal opening on that side of the casing provided with longitudinal side walls adapted to maintain sliding contact with the edges of the casing during expansion and contraction of the capsule. A power transmitting sleeve 7 is centrally mounted upon the guide member extending beyond that side of the casing. The guide member 6 is positioned with the sleeve 7 in the center of the casing and over the center of the capsule and the capsule is retained within the casing by caps 8 detachably secured on each open end of the casing. Each cap 8 is provided with a portion 9 adapted to fit within the end walls of the casing and close the same whereby the capsule 4 is retained in position. This closure portion 9 is provided with an extension 10 from one side slightly greater than the opening between the walls of the flat sides of the casing 2 and is formed to engage the flat walls thereof and terminate in a bend in the direction of the opposite flat casing side to form a hook to engage in oppositely disposed notches in the casing walls, and with an extension 11 from the other side of substantially the same shape and adapted to lie over the end extension of the flat extension of casing body, whereby by depressing the exterior end of the extension 11, due to the spring in the casing extension, the hook on the other extension 10 may be engaged or disengaged from the casing body. This extension 11 is provided with a central outwardly extending stud 12, the purpose of which will hereinafter be described. The guide member is of such length as to be engaged by the ends of the portions 10 of the caps 8 to properly position the power transmission sleeve 7.

The power element casing is preferably secured to the switch casing by four screws 13 and held in spaced relation thereto by screw threaded sleeves 14 on each screw arranged between the said casings. It is preferable to arrange these screws 13 equidistant from each other and from the power transmission sleeve 7 and provide openings 15 therefor for their insertion through the flat outer side of the casing 2 with their heads engaged with the interior of the inner walls of the opposite side. To insert the screws 13 apertures 15 are provided in the outer flat side of casing 4 through which the heads of the screws may be passed to engage the inner surface of the opposite flat side of the casing and then through the sleeves 14 to hold the same in engagement with the switch casing so that the actuating casing must be secured to the switch casing before the power element capsule 4 and follower plate 5 are inserted, thereby preventing the disengagement or removal of the actuating casing after the installation of the power element 4.

With the power element attached to the switch casing, the device is preferably secured to the pipe or tank, the temperature will control the operation by placing the flat and longitudinal outer side of the casing 2 against the longitudinal surface of the pipe or tank, passing strips 16 of perforated metal about the pipe or tank with one of the perforations in each strip engaging with the stud 12 upon each end cap 8, and drawing the strips tight against the pipe or tank, as shown in Figure 2, preferably, by the employment of two cylindrical members 17, approximately in length the width of the strip, each having a central transverse screw threaded aperture adapted to receive a securing screw 18 whereby the screw passing through one member 17 and through a perforation of the strip may be passed through a perforation in the other end of the strip and engaged with the other member 17 and secured. The screws 18 draw the ends of the strips toward each other and firmly clamp the device in place, the engagement of the studs 12 with the perforations prevent the strips from becoming disengaged as well as the casing from slipping from its original position. Inasmuch as the perforated strip may be of any desired

length, the size of the pipe or tank is immaterial. Since the outward extensions 11 of the caps 8 rest upon the casing extension when the hooked ends of the inward extensions 10 engage the notches in the casing walls and since the casing is of resilient metal, to attach or detach the caps 8 the outward extension 11 is depressed against the casing extension and the hooked portion of the cap is readily snapped into or out of engagement with the casing but when the casing is held against a pipe or tank the whole body of the casing is held rigid, so the cap can not become detached after the device has been clamped on the pipe or tank.

Since the switch operating mechanism includes a mercury tube switch to be operative, it is necessary that the switch casing be secured to the pipe or tank with the mercury tube in a certain predetermined relation to the vertical. As shown in Figures 1 and 2, the actuating member casing 2 is arranged to clamp the switch casing 1 upon a horizontal pipe or tank with the mercury tube switch in operating position. Since the actuating casing is secured to the switch casing by four screws equidistant from each other and from a common center, when it is desired to clamp the switch casing upon a vertical pipe or tank, it is only necessary to remove one of the caps 8, withdraw the power element or capsule 4 and follower plate 5, unless said follower plate is recessed about each screw head, to expose the screw heads through the opening 15. The screws may then be detached from the switch casing 1, the actuating casing 2 rotated one quarter turn, the screws again engaged with casing 1, the power element or capsule and follower plate reinserted, the cap snapped into engagement, and the device is ready to be clamped upon a vertical pipe or tank as shown in Figure 3.

The switch operating mechanism comprises a rectangular frame, as shown in transverse section in Figure 5, including a front plate 20 with spaced-apart top and bottom plates 21 and 22, each having formed flanges 23 adapted to rest against the rear wall of the casing 1 and be secured thereto and formed up ears 24 adapted to be secured to the front of plate 20. The operating member of the switch mechanism comprises two spaced-apart triangular plates 25 and 26 held in rigid relation to each other by the pivot pin 27 adjacent one apex having portions extending through and beyond each plate to pivotally engage bearings in the top and bottom plates 21 and 22 respectively, by an oppositely disposed spacing member 28 adjacent another apex, and, adjacent the third apex and thereof intermediate the others, by a spring anchor 29 also engaging both plates 25 and 26, whereby the operating member is mounted to oscillate within the frame. Each plate 25 and 26 is provided with an extension 30 projecting outward from the spacing member 28 between openings provided therefore in the front plate 20 so as to engage the front plate to limit the oscillation of said plates.

Extending from the side of the frame of the oscillating operating member a box like casing 31 is secured to the plates 21 and 22 which passes out through the side of casing 1 to house a coil spring 32 secured at one end to the spring anchor 29 and at the other end to a screw threaded block 33 mounted to travel longitudinally within the box casing 31 upon a screw threaded shaft 34 having a circular cap 35 adapted for rotation about the outer end of the box casing 31 and having a diametrical fin 36 projecting outwardly therefrom for manually adjusting the tension of the spring. It is preferable to provide a slot 37 on the front of the box casing which extends beyond the switch casing, through which an indicating pointer 38 upon the block 33 is visible and to graduate the edge of the slot to indicate the spring tension. An additional location 52 for spring anchor 29 is provided which may be used. The proper position to secure a uniform differential in connection with expansive liquids usually used is at 51 Fig. 8. When at 52 the differential in pounds is uniform or nearly so, but the temperature differential will decrease as the temperature rises.

The spring anchor 29 being to one side of the pivot 27 of the operating member, the spring 32 normally exerts a pull to rotate the member in that direction. A power transmission stud 39, adapted to be received within and be engaged by the power transmission sleeve 7 of the actuating mechanism is mounted upon a pivot 39—A mounted in bearings provided therefor in the operating member plates 25 and 26 upon the side of the plate pivot 27 most distant from the spring anchor 29, which stud 39 passes through an opening in the rear wall of the switch casing 1, so that upon expansion of the power element capsule movement will be transmitted through the sleeve 7 and stud 39 to cause the operating member to be rotated about its pivot 27 against the tension of the spring 32.

The switch 40, adapted to be operated by the operating mechanism, is of the type commercially known as a mercury tube switch and may be of any approved style of mercury switch in which the terminals of the circuit to be controlled are arranged in spaced-apart relation with a sealed tube containing a quantity of mercury so that when the tube is tilted with one end lower than the other the mercury will flow into that end and close the contact between the terminals and close the circuit and when tilted in the

opposite direction the mercury will flow into the opposite end, away from the terminals, and break the circuit. As shown in Figures 1 and 3, the mercury tube switch 40 is supported in clamps 41 and. Figures 5, 6, 9 and 12 show the clamps 41 depending from a switch supporting plate 42, which is shown in Figure 5 as being pivotally mounted in bearings provided in the front plate 20 and dependent flange 23 of the bottom plate 22. In order to tilt the switch plate 42 about its pivot 44 to operate the switch to make and break the circuit, a portion of the switch plate, preferably the outer end, is provided with an irregular track having an upward triangular projection 43 the apex of which is in a line passing through the center of the pivot member 44 of the plate 42 and perpendicular to the plate, with equally sloping side which curve with the bottom of the track. A roller 45 is arranged to travel over the track, which roller is mounted at the free end of a spring pressed member 46 pivoted between ears 47 formed down from the lower plate 26 of the operating frame whereby rotation of the operating member about its pivot 27 causes the roller 45 to travel over the track on the end of the pivoted switch supporting plate 42. A spring 48 Figure 5, is shown with one end engaging the member 46 passing beyond the pivot thereof and then bent back upon itself to engage the under side of the plate 26. The tension of this spring 48 is adjusted by means of a screw 50 which passes through the center of the spacing member 28 and through plate 26 to engage the portion of the spring 48 which bears upon the underside of said plate. The relation of the roller 45 and the triangular projection 43 of this track is so arranged that when the entire device is clamped on a pipe or tank in operative position and the temperature thereof has increased to or above the predetermined or desired degree said increase in temperature will have caused the power element or capsule 4 to expand, which movement will be imparted through the power transmission sleeve 7 and stud 39 to cause the operating member 25 to rotate against the tension of the spring 32 to the position shown in Figure 8 and when in this position the roller 45 will engage one sloping side of the projection 43 of the track as shown in Figures 9 and 10 and tilt the switch carrying plate 42, as shown about its pivot 44 to tilt the mercury tube switch to open position. When the temperature within the pipe or tank decreases below that predetermined or desired, the capsule 4 contracts and the tension spring 32 causes the operating member to rotate about its pivot 27 in the opposite direction and through the spring pressed member 46 causes the roller 45 to travel over the apex of the projection 43 and engage the opposite sloping side thereof, as shown in Figures 6 and 7, whereby the mercury tube switch is tilted to closed position. As the capsule 4 or power element, acted upon by the changes in temperature of the pipe or tank, expands and contracts in response to the fluctuation of said temperature, the mercury tube switch will be tilted back and forth to open and close the circuit it controls. Should the capsule become defective or punctured so that it collapses it will contract more than normal movement to the operating member, whereby a greater than normal movement will be imparted to the roller 45 away from the track projection 43. As a safeguard to insure the breaking of the circuit, should such a failure of the actuating element occur, an additional projection 49 is provided upon the track with an angular projection parallel to the "off" position angular side of projection 43 which the roller will engage and tilt the switch to the open position as shown in Figures 12 and 13. The roller and switch will assume this "off" position whenever the capsule 4 is removed from its casing, such as when it is desired to change the actuating casing relative to the switch casing.

The extra travel of the mechanism to off position as shown in Figures 11, 12 and 13 may be left off if desired, by proper location of the stops on front plate 20, so as to permit of but two position operation.

At times it is desirable to control two circuits and in such a case two mercury tubes are adapted to be supported in an additional set of clamps supported upon the plate 42, as shown in Figure 5. Figure 3 illustrates two circuits, each connected to a mercury tube switch, in which one circuit is broken when the other is closed.

What I claim is:—

1. A pressure actuated switch operating device, comprising an actuating mechanism including a temperature responsive expansible and contractible element contained within a casing and a switch operating mechanism contained within a separate casing, means for attaching the two casings to each other and forming a transmission connection between the actuating and operating mechanisms, and means for clamping the actuating casing upon a fluid container including means preventing the removal of the expansible and contractible element when the device is in clamped position.

2. A pressure actuated switch operating device, comprising an actuating mechanism including a temperature responsive expansible and contractible element contained within a casing and a switch operating mechanism contained within a separate casing, means for attaching the two casings to each other and forming a transmission connection

between the actuating and operating mechanisms, and means for clamping the actuating mechanism upon a fluid container including a detachable closure for the actuating mechanism casing adapted to be engaged by said clamping means and prevent the removal of the expansible and contractable element.

3. A pressure actuated switch operating device, comprising a temperature responsive expansible and contractible capsule, a casing therefor, detachable closures for the casing, a switch operating mechanism contained within a separate casing, means for attaching the two casings to each other and forming a transmission connection between said capsule and said operating mechanism, and means for clamping the capsule casing upon a fluid container and preventing detachment of said closures from the casing when the device is in clamped position.

4. A pressure actuated switch operating device, comprising a temperature responsive expansible and contractible flat capsule, a casing therefor snugly receiving said capsule, a switch operating mechanism contained in a separate casing, means for attaching the empty actuating casing to the operating casing, a power transmission connection carried in the actuating casing, the insertion of the flat capsule in the empty casing after being attached to the other casing, acting to bring the power transmission connection in contact with the switch operating mechanism and render the attaching means secured against detachment.

5. A pressure actuated switch operating device, comprising a temperature responsive expansible and contractible capsule, means to transmit the movement of the capsule in expanding and contracting to a switch operating member, means connecting said operating member to a switch to throw the switch to open position when the capsule expands beyond a predetermined degree, a spring acting upon the operating member to actuate the operating member to throw the switch to closed position when the capsule contracts to said predetermined degree, and means upon abnormal contraction of the capsule to actuate the operating member to throw the switch to open position.

6. A pressure actuated switch operating device comprising a temperature responsive pressure actuated member, a switch operating mechanism and means to transmit movement from the pressure member to the operating mechanism, said switch operating mechanism including a spring actuated pivoted operating member normally in engagement with the movement transmitting means, a pivoted switch carrying member mounted to rotate at right angles to the operating member, and means actuated by rotative movement of the operating member to rotate the switch carrying member to operate the switch.

7. A pressure actuated switch operating device comprising a temperature responsive pressure actuated member, a switch operating mechanism and means to transmit movement from the pressure member to the operating mechanism, said switch operating mechanism including a pivoted operating member, a spring normally holding the operating member in engagement with the movement transmitting means, a switch carrying member, a pivot therefor mounted at right angles to the pivot of the operating member, means upon the switch carrying member co-operating with means carried upon the operating member to operate the switch upon variation of pressure of the pressure actuated member.

8. A pressure actuated switch operating device comprising a temperature responsive pressure actuated member, a switch operating mechanism and means to transmit movement from the pressure member to the operating mechanism, said switch operating mechanism including a pivoted operating member, a spring normally holding the operating member in engagement with the transmitting means, means for adjusting the tension of the spring, a mercury tube switch, a pivoted switch carrying member, mounted to rotate at right angles to the operating member, means upon the switch carrying member co-operating with a spring pressed member carried upon the operating member to snap the mercury tube to open and closed position upon transmission of movement from the pressure actuated member.

9. A pressure actuated switch operating device comprising a temperature responsive pressure actuated member, a switch operating mechanism and means to transmit movement from the pressure member to the operating mechanism, said switch operating mechanism including a pivoted spring actuated operating member normally in engagement with the transmitting means, a pivoted switch carrying member, a mercury tube switch carried thereby, a spring pressed roller mounted on the operating member, an irregular track mounted upon the switch carrying member over which the roller is adapted to travel with the irregularities so formed that movement of the roller in one direction rotates the carrying member in one direction and thereafter movement in the opposite direction imparts a rotation in the opposite direction.

10. A pressure actuated switch operating device comprising a temperature responsive pressure actuated member, a switch operating mechanism and means to transmit movement from the pressure member to the operating mechanism, said switch operating

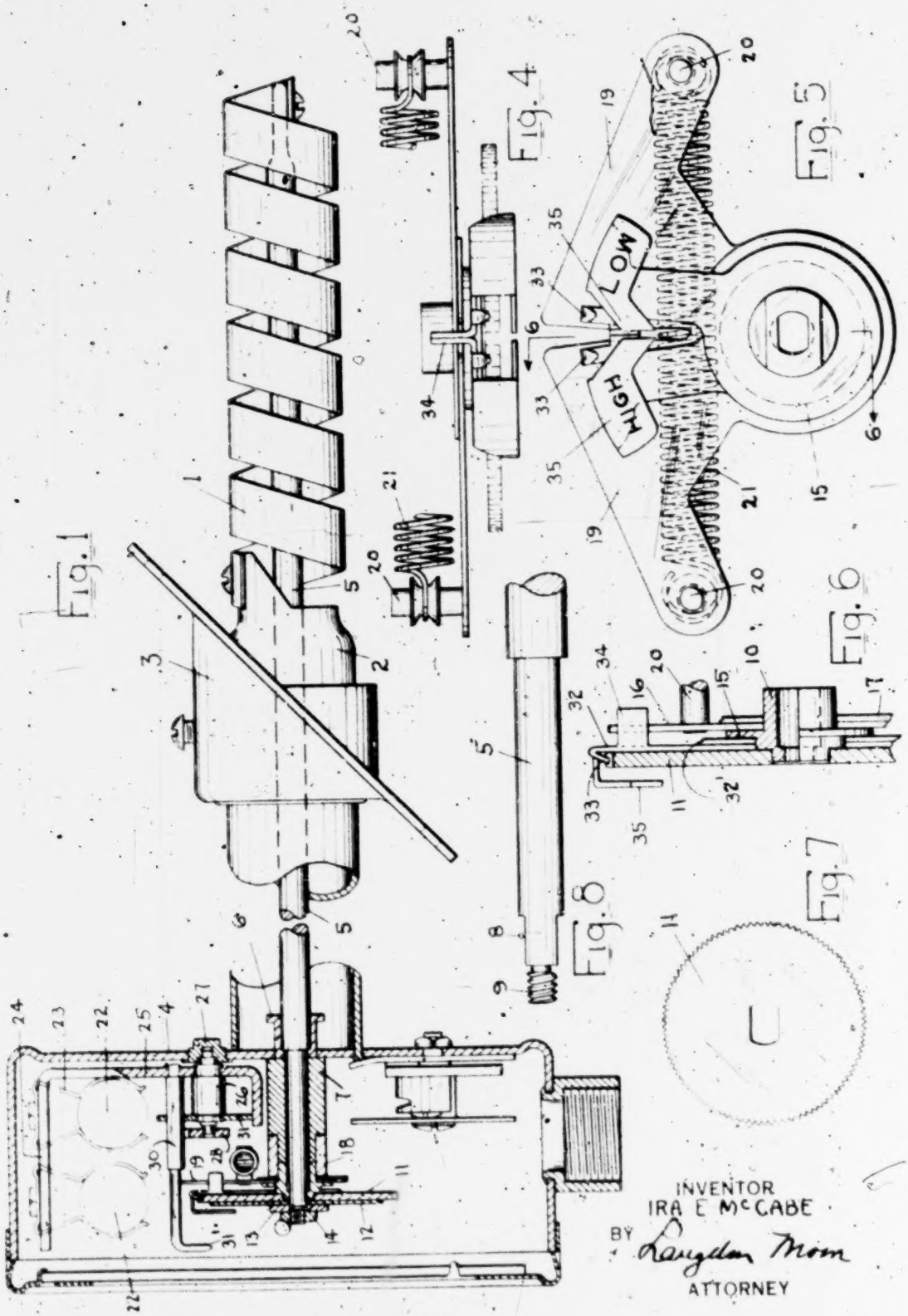
mechanism including a pivoted spring actuated operating member normally in engagement with the transmitting means, a pivoted switch carrying member, a mercury tube switch carried thereby, a spring pressed roller mounted on the operating member, an irregular track mounted upon the switch carrying member over which the roller is adapted to travel with the irregularities so formed that movement of the roller in one direction rotates the carrying member in one direction and thereafter movement in the opposite direction imparts a rotation in the opposite direction, and continued movement in that direction returns the switch carrying member to the first position.

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Dec. 1, 1931. I. E. McCABE 1,834,288

ELECTRIC SWITCH MECHANISM

Filed Aug. 5 1929 2 Sheets-Sheet 1



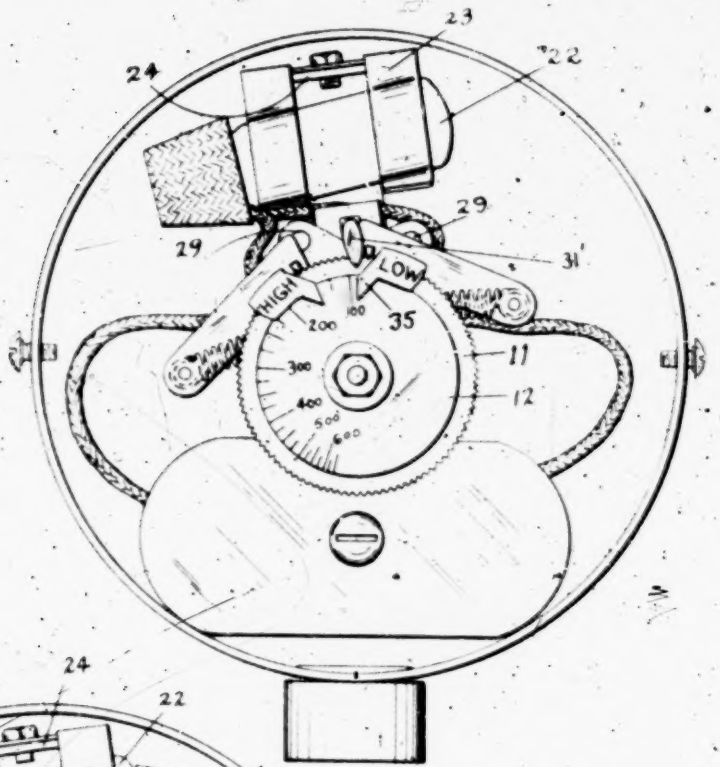
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ELECTRIC SWITCH MECHANISM

Filed Aug. 5, 1929 2 Sheets-Sheet 2

Fig. 2



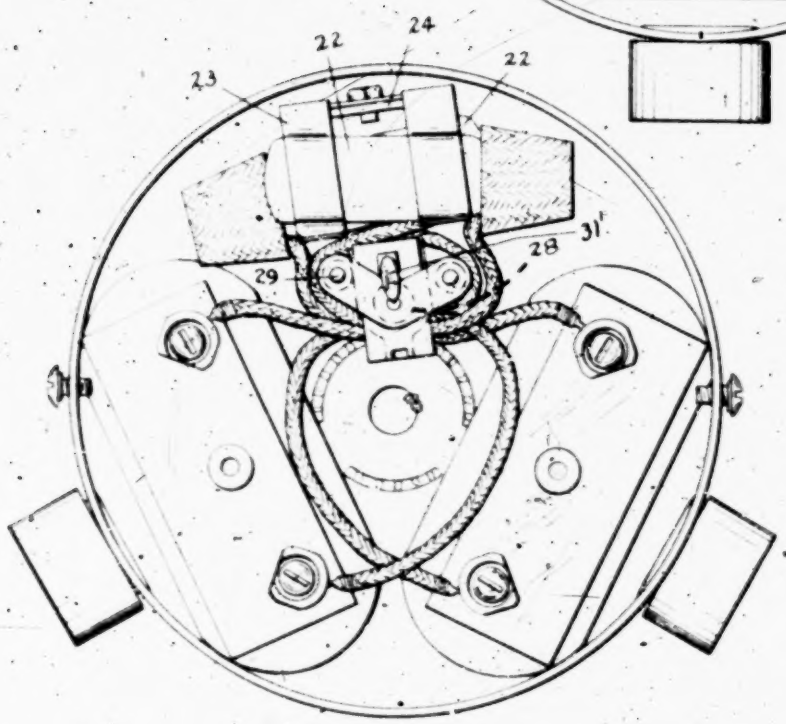


Fig 3

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ELECTRIC SWITCH MECHANISM

Application filed August 5, 1929. Serial No. 383,568.

This invention relates to improvements in electric switch mechanism and in particular to an electric switch mechanism which is responsive to temperature changes.

It is an object of this invention to provide a device of this character which is actuated by changes in temperature to make and break an electric circuit, and is advantageously employed as a safety device in electrically operated oil burning heating systems. The purpose of this device is to break the motor circuit of the oil burner and thereby discontinue the combustion in the furnace or heater when the temperature of the combustion reaches a degree which is dangerous to the furnace or heater. In order to produce a device of this kind which will be readily adapted to various types and sizes of heaters in which the degrees of heat produced by the combustion without endangering the furnace or heater may vary, in accordance with the respective types or sizes, it is necessary that the device be adjustable, and further desirable to have at hand indicating means showing the actual temperature of the furnace or heater in which the device is installed. It is another object of this invention to provide a safety device of this character which may be set on the job to break the motor circuit when the degree of temperature dangerous to the particular type or size of heater or furnace is approached.

This invention provides means for indicating the actual temperatures of the furnace and means for indicating the temperature at which the control will operate to make or break the circuits, together with means for quickly and conveniently adjusting the instrument to operate at the desired temperatures.

With these and other objects in view reference is made to the accompanying sheets of drawings which illustrate a preferred form of this invention with the understanding that minor detail changes may be made therein without departing from the scope thereof.

In the drawings:

Figure 1 is a view partly in side elevation and partly in vertical central longitudinal section illustrating the application of this invention with the mercury tube switches omitted.

Figure 2 is a view in end elevation of Figure 1 with the cover of the switch mechanism casing removed, illustrating the use of a single mercury tube switch.

Figure 3 is a view similar to Figure 2, illustrating the application of two mercury tube switches, and with the operating shaft and mechanism carrier thereby omitted.

Figure 4 is an enlarged detailed top plan view, with parts broken away, of the adjusting mechanism.

Figure 5 is a view in front elevation of Figure 4.

Figure 6 is a fragmentary detailed view in section taken on the line 6—6 Figure 5.

Figure 7 is a detailed view in front elevation of the toothed disc shown in Figures 1 and 2.

Figure 8 is an enlarged detailed view of that end of the operating shaft which mounts the operating mechanism.

In the embodiment of this invention illustrated upon the accompanying drawings, the thermostatic element is illustrated as a helical coil 1 of bi-metallic material, one end of which is secured to a housing 2 adapted to be inserted through the duct or casing of a furnace or heater employing an electrically controlled oil burner mechanism. The housing 2 is preferably held in position in the hot air duct or casing by an adjustable clamping member 3 and it is preferable to extend the housing through this member to engage the rear wall of the switch mechanism casing 4. The other end of the helical coil 1 is rigidly secured to an operating shaft 5 which passes through a bearing 6 in the rear wall of the casing 4, the shaft passing through this bearing also passes through a shouldered spacing member 7. The end of the shaft 5 terminating within the casing 4 is provided with oppositely deposed parallel flat cut-away surfaces 8, as shown in Figure 8, and at this extremity is screw threaded, as at 9. A flanged sleeve 10 is keyed upon the flat surfaced portion of the shaft 5 and a toothed disc 11 is keyed upon the sleeve 10, as shown in Figure

6. A disc 12, of less diameter than the disc 11, is preferably mounted on the end of the shaft 5 and held in engagement with the disc 11 by a washer 13 and nut 14 upon the screw threaded portion 9 of the shaft 5. The flanged sleeve 10 engages the spacing member 7 and is provided with an outstanding circular flange 15. Two plates 16 and 17 are rotatively mounted upon the sleeve 10 and are held against the flange 15 by a sleeve 18 interposed between said plates and the shoulder of the spacing member 7. The plates 16 and 17 are each provided with radial extensions 19, as shown in Figure 5, the extensions 19 of the plates 16 and 17 are provided with adjacent substantially radial edges with angular portions extending away therefrom. The ends of these angular portions opposite the respective radial edges are each provided with anchors 20 for engaging the opposite ends of a coil spring 21, the tension of which is sufficient to normally maintain the radial edges adjacent each other.

One or more mercury tube switches 22 are secured by clips 23 to a carrying arm 24 bent at right angles to a switch operating plate 25 which is pivotally mounted upon the pivot pin 26, mounted in the bearing 27 secured to the rear wall of the casing 4 and a bearing plate 28, held in spaced relation to the rear wall of the casing 4 by the posts 29, which also serve as stops limiting the movement of the operating plate 25 in either direction. An operating arm 30 is secured to the switch carrying plate 25 above its pivot 26 and held in parallel relation to said pivot by the plate 31 mounted thereon between the bearing plate 28 and switch carrier plate 25. The operating arm 30 extends beyond the bearing plate 28, passing over a cut-away portion thereof, and terminating in a downwardly extending finger or indicator 31 in advance of the toothed disc 11, said finger or indicator providing means of showing the actual temperature of the furnace or heater in which the device is installed.

The radial extensions 19 are of such proportions that the radial edges thereof may be brought into engagement with the switch operating arm 30. Between the toothed disc 11 and flange 15 two plates 32 and 32' are loosely mounted upon the sleeve 10. These plates are each provided with upwardly extending portions and each provided with bent down finger 33 adapted to engage in the teeth of the toothed disc 11, that portion of the plate directly below the toothed finger is provided with a bent back portion 34 adapted to pass between the radial edges of the extensions 19 of the plates 16 and 17, and that portion of the plate next above the finger is bent outwardly over the circumference of the toothed disc and then downwardly parallel to the surface of said disc and terminated in pointers 35, the edges of which are in line with the bent back portions 34 and each of these pointers are adapted to pass over the plate 12, as shown in Figure 2.

The fingers 33 are slidable over the toothed disc 11 and will normally hold the plates 32 and 32' of the fingers in contact with the toothed plate 11. The spring 21 of the radial extensions 19 of plates 16 and 17 will normally hold their respective radial edges against the backward extensions 34 of the finger carrying plates. The radial edges of the plates 19 upon rotation of the shaft 5 will, through the connection of the fingers 33 to the toothed disc 11 and portions 34, engage the switch operating arm 30 when the shaft 5 is rotated in one direction to move the arm 30 in that direction and tilt the switch carrying plate 28, thereby making or breaking, as the case may be, the circuit through the mercury tube 22, and when the shaft 5 is rotated in the opposite direction the radial extension 19 of the other plate will in the same manner engage the opposite side of the switch operating arm 30 and tilt the switch in the opposite direction. The fingers 33 may be manually moved to slide over the teeth of the disc 11 so that the relative relation of the radial edges of the plates 19 may be adjusted independently of each other and cause them to engage the opposite side of the switch operating shaft 30 as desired. The plate 12 on the outer side of the toothed disc 11 may be calibrated to display a temperature scale and, as seen in Figure 2, the pointers 35 are adapted to travel over such scale and by the proper manual adjustment of the fingers 33 upon the toothed disc 11 their respective radial extensions 19 may be so adjusted that the radial edges thereof upon rotation of the shaft 5 in one direction will engage the switch operating arm 30 and tilt the switch at a predetermined temperature and upon rotation in the opposite direction the other radial extension may be caused to engage the switch operating arm 30 at a predetermined temperature and tilt the switch in the opposite direction.

While Figure 2 illustrates a single mercury tube switch 22 it is obvious that two or more mercury tube switches might be supported as indicated in Figure 4. Figure 3 does illustrate two mercury tube switches mounted upon the switch carrying plate 25 tilted in one direction with a circuit closed in one switch and broken in the other, and it is obvious that when the switch carrying plate 25 is tilted in the opposite direction the closed circuit will be broken and the open circuit will be closed.

The fingers 33, while described as being slidable over the toothed disc 11 do not actually ride over the teeth of this disc but actually engage the teeth, when positioned, forming a lock between the finger carrying plates and toothed disc. The adjustment of the

fingers upon the toothed disc is performed by pressing the portion carrying the pointer 35 in the direction of the disc which will move the fingers out of engagement with the teeth so that the plates 32 and 32¹ may be rotated to the proper position and when the pressure is released upon the pointer 35 the resiliency of the plate will cause the fingers 33 to move forward and engage between two teeth of the disc. It is seen that by this construction an easy operable adjustment of the positions of the fingers is readily made and when the fingers are positioned the plates 32 and 32¹ are rigidly fixed to the toothed disc 11.

The coil spring 21 not only urges the abutment of the plates 16 and 17 toward the switch operating arm 30 but also allows a further movement of the operating shaft and toothed disc after the switch carrying plate has been tilted if the bi-metallic coil should expand or contract a greater degree than that required to tilt the switch plate, thereby preventing the possibility of the bi-metallic coil from taking a set.

What I claim is:

1. In a mercury switch mechanism, a thermal actuating member, an operating shaft actuated thereby, a tiltable switch carrying plate, means for tilting said plate, and means mounted upon the operating shaft for engaging said tilting means, and means for adjusting the time of said engagement.

2. In a switch operating mechanism, a thermal actuating member, a tiltable switch carrying plate, means upon the plate for tilting the same, an operating shaft actuated by the said thermal member, an operating disc fixed upon said shaft, adjustable abutments rotatably mounted upon said shaft adapted to engage the switch plate tilting means, and means for adjustably positioning and securing said abutments to said operating disc.

3. In a mercury tube switch operating mechanism, a tiltable mercury switch carrying plate, means thereon for tilting said plate, a thermal actuating member, an operating shaft actuated thereby, an operating disc secured thereon, abutment members rotatively mounted upon said shaft adapted to engage the switch plate tilting means, resilient means normally drawing said abutment members toward the tilting means, adjusting members rotatively mounted upon said shaft provided with means for engaging the abutment members and having means adapted to removably engage the operating disc, whereby said adjusting means may be manually positioned at predetermined points upon the operating disc and thereby position the abutment members to tilt the switch plate through the thermal actuating member at predetermined temperatures.

4. In a mercury tube switch operating mechanism, a tiltable mercury switch carrying plate, means thereon for tilting said plate, a thermal actuating member, an operating shaft actuated thereby, an operating disc secured thereon, abutment members rotatively mounted upon said shaft adapted to engage the switch plate tilting means, resilient means normally drawing said abutment members toward the tilting means, adjusting members rotatively mounted upon said shaft provided with means for engaging the abutment members and having means adapted to removably engage the operating disc, whereby said adjusting means may be manually positioned at predetermined points upon the operating disc and thereby position the abutment members to tilt the switch plate through the thermal actuating member at predetermined temperatures, said resilient means acting upon said abutment members providing means after the said abutment has tilted the switch plate to allow further movement of the operating shaft in the same direction.

5. In a mercury tube switch operating mechanism, a tiltable mercury switch carrying plate, means thereon for tilting said plate, a movable actuating member, an operating shaft actuated thereby, an operating disc secured thereon, abutment members rotatively mounted upon said shaft adapted to engage the switch plate tilting means, resilient means normally drawing said abutment members toward the tilting means, adjusting members rotatively mounted upon said shaft provided with means for engaging the abutment members and having means adapted to removably engage the operating disc, whereby said adjusting means may be manually positioned at predetermined points upon the operating disc and thereby position the abutment members to tilt the switch plate through the actuating member upon predetermined movements thereof, said resilient means acting upon said abutment members providing means after the said abutment has tilted the switch plate to allow further movement of the operating shaft in the same direction.

6. In a mercury tube switch operating mechanism, a tiltable mercury switch carrying plate, means thereon for tilting said plate, a thermal actuating member, an operating shaft actuated thereby, an operating disc secured thereon, a temperature scaled disc also fixed upon the said shaft, abutment members rotatively mounted upon said shaft adapted to be engaged to the switch plate tilting means, resilient means normally drawing said abutment members toward the tilting means, adjusting members rotatively mounted upon said shaft provided with means for engaging the abutment members and having means adapted to removably engage the operating disc and provided with pointers adapted to coact with the temperature sealed disc to indicate the temperature

to which the thermal actuating member is subjected, whereby said adjusting means may be manually positioned at predetermined temperatures indicated upon said temperature scaled disc and thereby position the abutment members to tilt the switch plate through the thermal actuating member at predetermined temperatures.

IRA E. McCABE.

MERCOID EXHIBIT XXX 4

F. A. KUNTZ.

HEATING AND VENTILATING SYSTEM.

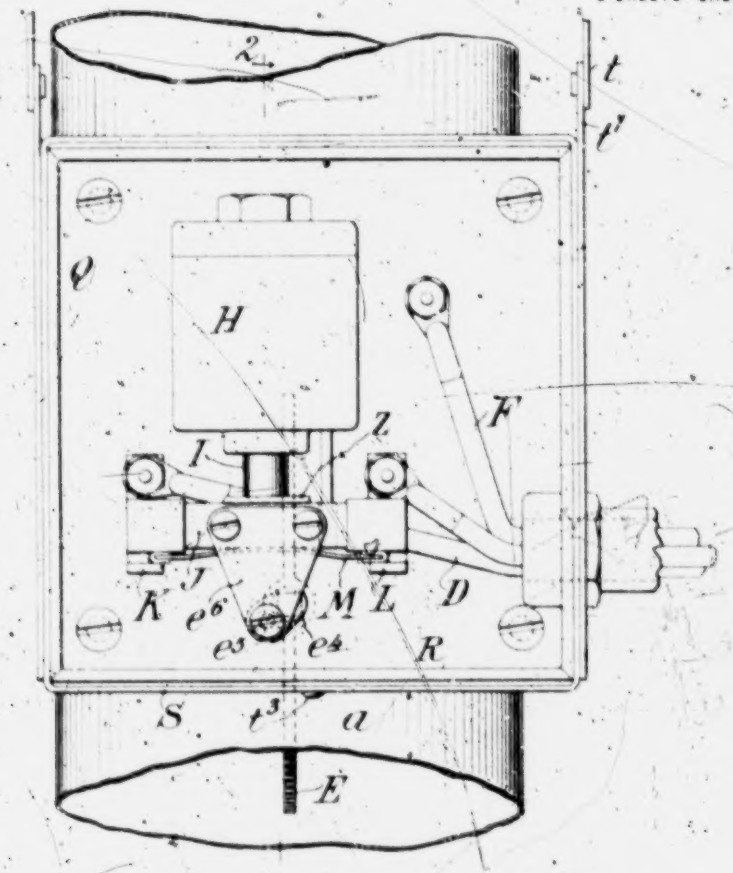
APPLICATION FILED AUG. 20, 1915.

1,193,271.

Patented Aug. 1, 1916.

2 SHEETS—SHEET 1.

Fig. 1.



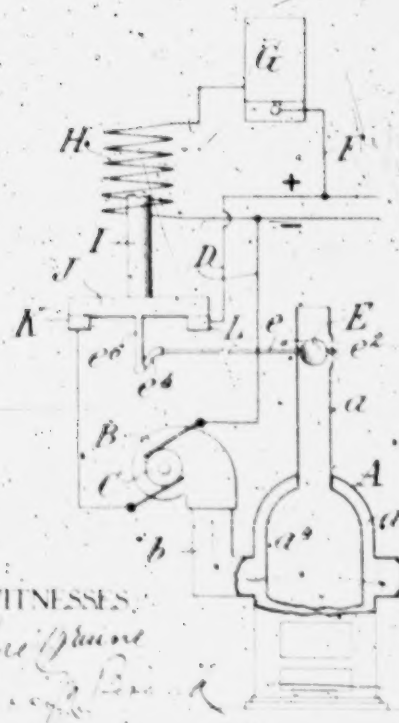


Fig. 4.

WITNESSES:

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HEATING AND VENTILATING SYSTEM.

APPLICATION FILED AUG. 20, 1915.

1,193,271.

Patented Aug. 1, 1916.

2 SHEETS—SHEET 2.

Fig. 2.

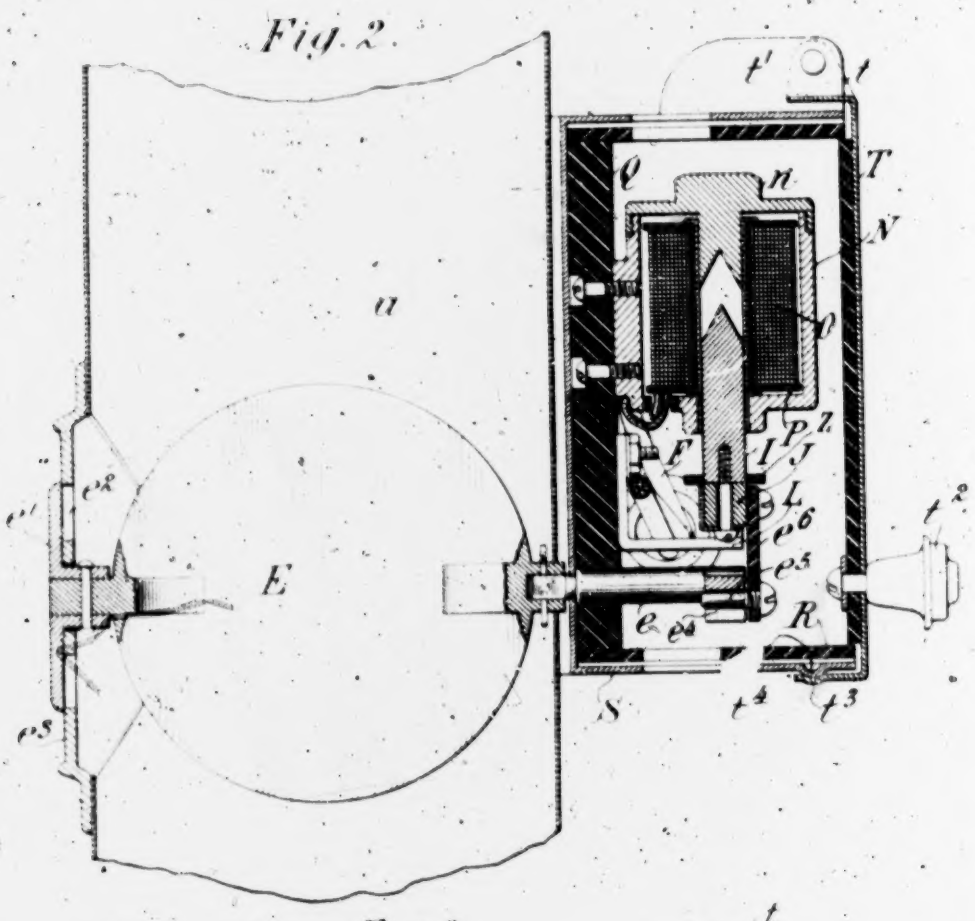
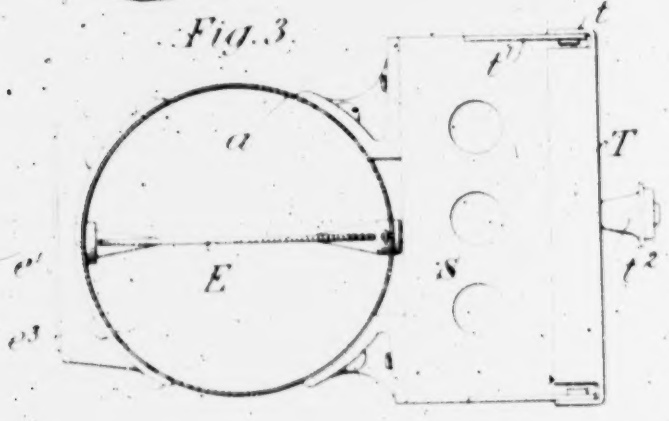


Fig. 3.



WITNESSES

Geo. Gibbons

INVENTOR

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UNITED STATES PATENT OFFICE.

FRANK A. KUNTZ, OF NEW YORK, N. Y., ASSIGNOR TO GOLD CAR HEATING & LIGHTING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

HEATING AND VENTILATING SYSTEM.

1,193,271. Specification of Letters Patent. Patented Aug. 1, 1916.

Application filed August 20, 1915. Serial No. 46,518.

To all whom it may concern:

Be it known that I, FRANK A. KUNTZ, a citizen of the United States, residing at Richmond Hill, borough of Queens, city and State of New York, have invented certain new and useful Improvements in Heating and Ventilating Systems, of which the following is a specification.

My invention relates to heating and ventilating systems and aims to provide improved means whereby the draft is regulated, and at the same time the supply of air to the air heating chamber of the heater is controlled.

A desirable form in which my invention may be embodied is illustrated in the accompanying drawings, wherein.

Figure 1 is a plan view of electromagnetic operating means used in connection with my system, partly broken. Fig. 2 is a section thereon on the line 2—2 of Fig. 1. Fig. 3 is a top view of Fig. 1, and Fig. 4 is a diagram illustrating one use of my invention.

According to my invention the heater A, which may be any heat producing furnace or stove, consuming fuel and therefore requiring a stack, is provided with a stack a, and has the usual heating chamber a^1 from which the heated air is conducted by conduits a^2 to the desired point, as, for instance, registers a^3. A centrifugal fan or blower B supplies air to the chamber a^1 through conduit b and is driven by an electric motor C. The electric motor C is included in a main electric circuit D. The stack a contains the usual damper E, and on the shaft e of this damper is a perforated disk e^1, the perforations in which are adapted to aline with similar perforations e^2 in a plate e^3 covering an opening in the side of the stack when the damper E is closed, and to close the openings e^2 when the damper is open.

Means are provided by me for simultaneously controlling the damper E and the blower B.

The controlling means are operated in a shunt circuit F, which includes a thermostat G. The particular type of thermostat forms no part of this invention, and is therefore not illustrated. Many types of thermostats appropriate for this purpose are known, and this thermostat is of a type adapted to be affected by the temperature of the apartment in which the same is contained, and to close the shunt circuit F when the temperature of the apartment rises sufficiently high, and to open the shunt circuit when the temperature drops below the desired point. In the shunt circuit is also contained an electromagnet, illustrated as a solenoid H, the construction of which is shown in detail in the sectional view, Fig. 2. The core I of this solenoid is attached to a bridge piece J, and this bridge piece is adapted to close the circuit between two contact jaws K and L in the main circuit D when the solenoid H is deenergized, and to break the said circuit when the solenoid is energized.

The shaft e of the damper E has a crank e^4 thereon which is connected by a connection e^6 to the bridge piece J. Suitable means are provided to enable the movement of the bridge piece J to turn the damper E, and such means take the form of a pin and slot connection e^5 between the said parts, as seen in Fig. 2, whereby the requisite lost motion is obtained.

I prefer to employ in connection with my heating and ventilating system the automatic switch illustrated in my application filed August 19, 1915, Serial No. 46,283, but the said switch is not claimed here, but is claimed in my said companion application. In the construction of the said switch the bridge piece J is formed of magnetic metal and is attached to the core I so as in effect to become a part thereof, and thereby the magnetic field is extended, and when the magnet is energized so as to lift the said bridge and break the main circuit D the said bridge piece acts as a magnetic blowout, and the lines of flux will extinguish or destroy the arcs which would otherwise exist between the bridge J and the contacts K and L. In connection with the said bridge I prefer to make contact with the contact jaws K, L by means of a phosphor-bronze brush M which has spring motion and gives the desired wiping contact when the circuit is closed.

The solenoid H is provided with a shell N which may be of cast iron, and has threaded thereon a cap n, the inner part of which acts as a part of the core I. The coil O is suitably connected to the wires of the shunt circuit F and is situated within a bobbin P which may be formed of fiber or bakelite. The solenoid is supported upon a backing of suitable insulating material, such as the slate plate Q. It is surrounded by an asbestos

lining R and is situated within a cabinet S, which may be formed of pressed steel and has a cover T having lugs t which are pivotally supported on corresponding ears t^1 on the side of the cabinet. This cover has a finger piece t^2 and is held in place by bosses t^3, t^3 on the cover and body respectively.

The core of the magnet is provided with a washer Z which, when the magnet is energized, acts as a stop by contacting with the shell N. This sudden stoppage of the core causes a violent vibration of the brush M, which assists in blowing out arcs that would otherwise exist between the bridge J and the contact jaws K, L.

The operation of my device is as follows: When the temperature in the apartment to be heated falls to a point indicating that more heat is desired, the thermostat G breaks the shunt circuit F; thereupon the core I drops and the bridge J makes contact with the contact jaws K, L, closing the main blower circuit D and starting the blower B and causing a current of fresh air to flow into the heater A and out through the registers a^3. At the same time the bridge J turns the damper E so as to open the same and cause a draft through the fuel chamber a^4, thereby heating the air which is supplied from the blower. When the apartment becomes sufficiently heated the thermostat J closes the shunt circuit F, whereupon the solenoid H is energized and the core I is lifted, breaking the motor circuit D and reversing the position of the damper E, and at the same time opening the stack vents e^1 e^2. When the core I is lifted the magnetic lines of flux then flowing will extinguish arcs which would otherwise be formed between the magnetic bridge J and the contact jaws K, L. The energizing of the magnet will have lifted the core I until the washer Z strikes the shell N, which it does with a sudden blow, causing violent vibrations of the brush M, and these vibrations assist in fanning or slapping out the said arcs.

I prefer to construct the bridge of iron, and the contact jaws K, L may be made of copper.

The blower B may be of any approved construction, such as a centrifugal fan or blower; the solenoid H is preferred, although another form of electromagnet employing an armature might be used.

My invention is not limited to the particular means for operating the damper and blower illustrated, although I prefer such means, nor is the invention limited to the particular connections between the bridge and damper, as these details of construction may be changed within the limits of the appended claims.

What I claim is:—

1. In a heating and ventilating system, a stove, a stack therefor, a damper in the stack, a blower adapted to supply air to an air heating chamber in the stove, an electric motor for the blower, an operating circuit for said motor having separated contact jaws, a shunt circuit, a thermostatic controller therein affected by the temperature of the surrounding atmosphere, an electromagnet in said shunt, a bridge operatively connected to the moving part of the said electromagnet and adapted to engage said contacts and close the motor operating circuit, and an operating connection from said moving part to said damper, whereby when the thermostatic controller changes the condition of the shunt, the electromagnet is caused to correspondingly operate the blower and damper.

2. In a heating and ventilating system, a stove, a stack therefor, a damper in the stack, a blower adapted to supply air to an air heating chamber in the stove, an electric motor for the blower, an operating circuit for said motor having separated contact jaws, a shunt circuit, a thermostatic controller therein affected by the temperature of the surrounding atmosphere, an electromagnet in said shunt, a bridge of magnetic metal attached to the core of said electromagnet and adapted to engage said contacts and close the motor operating circuit, and an operating connection from said moving part to said damper, whereby when the thermostatic controller closes the shunt the magnet is energized and the bridge closes the damper and breaks the blower circuit and acts as a magnetic blowout to destroy arcs.

3. In a heating and ventilating system, a fuel consuming stove, a stack therefor, a draft regulator therein, means for supplying air to an air heating chamber in the stove, electric driving means therefor, a main circuit including said driving means, a bridge adapted to close said main circuit and having an operating connection to said damper, a shunt circuit, means for opening and closing the shunt, an electromagnet in the shunt, and an operating connection from the moving part of said electromagnet to said bridge.

4. In a heating and ventilating system, a fuel consuming stove, a stack therefor, a draft regulator therein, means for supplying air to an air heating chamber in the stove, electric driving means therefor, a main circuit including said driving means, a bridge made of magnetic metal and adapted to close said main circuit and having an operating connection to said damper, a shunt circuit, means for opening and closing the shunt, a solenoid in the shunt and a connection between the core thereof and said bridge whereby when said controlling means opens the shunt the magnet is deënergized

and the bridge opens the draft regulator and closes the main circuit, and when the controlling means closes the shunt the magnet is energized and the bridge closes the draft regulator and breaks the main circuit and at the same time blows out the arcs.

5. In a heating and ventilating system, a fuel consuming stove, a draft regulator therefor, means for supplying air to an air heating chamber therein, an electromagnetic device for controlling said air supplying means, a direct connection from a moving part of said electromagnetic device to said draft regulator, an electric circuit including said electromagnetic device, and a thermostat affected by the temperature of the apartment to be heated and adapted to control said circuit.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

FRANK A. KUNTZ.

Witnesses:
F. T. KITCHEN,
F. BARAS.

MERCOID EXHIBIT L

Feb. 4, 1941. J. S. BAKER 2,230,446

AUTOMATIC CONTROL SYSTEM FOR WARM AIR FURNACES

Filed July 16, 1934 4 Sheets-Sheet 1

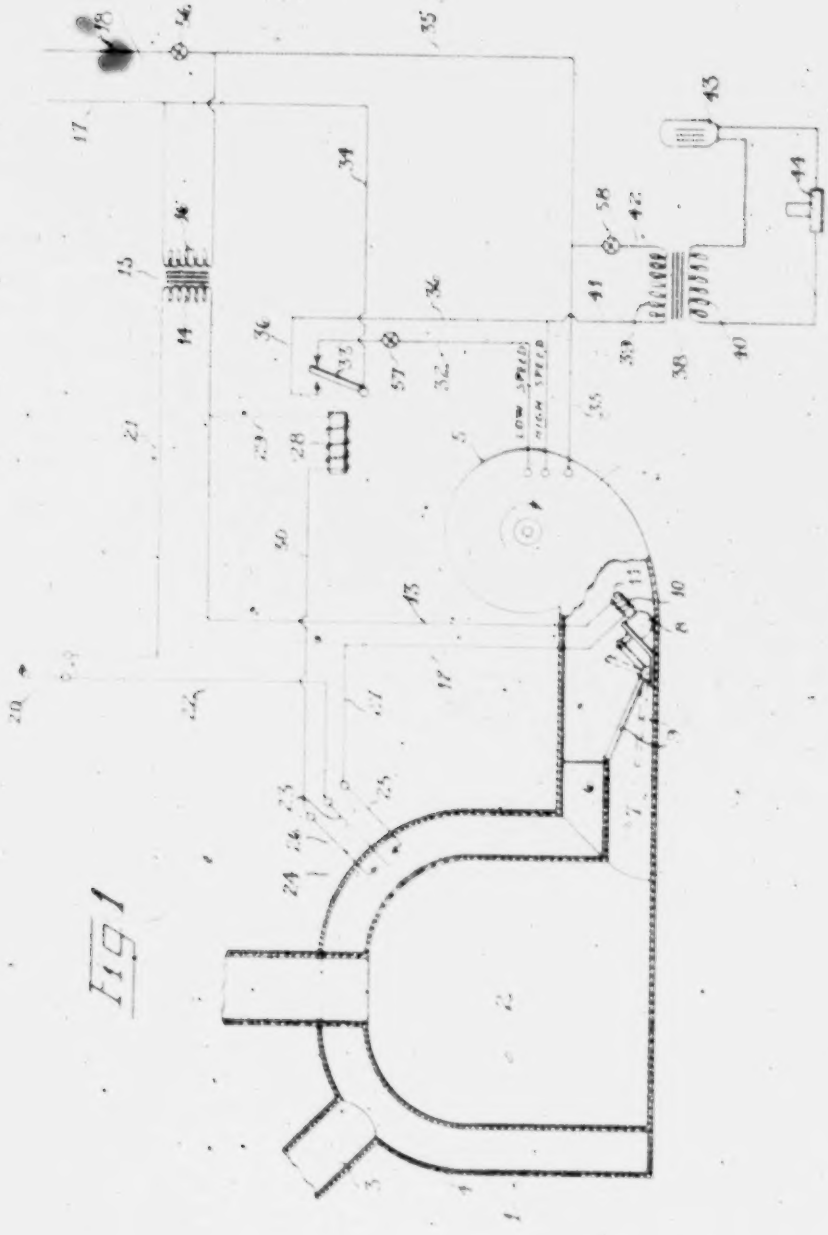


Fig 1

INVENTOR
John S. Baker
Jones & Addington Jones & Selvidge
ATTYS

deenergized so that armature 90 will drop back to engage contact 95 of the low speed circuit of blower 5, which low speed circuit includes this contact 95, wire 96, blower 5 and wire 87.

Low speed operation of the blower will then occur if the temperature of the furnace is high enough to prevent the air being delivered by blower 5 from entering the room at a temperature chilling the room, say above the aforesaid low degree of 100° Fahr. Furnace switch 83 will be closed and the relay 85 will be energized. Energization of relay 85 attracts armature 93 into circuit closing position against contact 92. It will be observed, therefore, that the furnace control hereindisclosed functions practically at all times to keep the blower 5 in operation, either at high or at low speeds, in order to provide a continuous movement of heated air into the room.

In case the furnace is not fired by coal or other solid fuel but by liquid fuel, such as oil or gas, the damper controller 66 may be omitted and the relay 100 inserted in the circuit of room thermostat 60, such as I have illustrated diagrammatically in Fig. 6. Coil 101 of relay 100 is connected between wire 61 and 67. A combustion supporting device 102 employed in oil or gas fired furnaces, or which may be the oil or gas burner itself, is connected across the line by wires 103 and 104. If so desired, the burner 102 may be of the high and low flame type, having high and low flame circuits controlled by relay 100. The high flame circuit may include wire 105, contact 106, armature 107 of relay 100, wire 108, and device 102. The low flame circuit may include wire 109, contact 110, armature 107 of relay 100, wire 108 and device 102.

In the event the room thermostat 60 calls for heat and the furnace temperature has not exceeded a predetermined degree causing overheating of the furnace, current flowing through the circuit of the room thermostat will energize relay 100 and attract its armature into engagement with contact 106 of the high flame circuit of burner 102. The rate of combustion will be accelerated until the furnace temperature reaches a high point that will effect the opening of furnace switch 64 or, as the result of the increased combustion, permit the blower operating at high speed to deliver sufficient warm air to the room to raise the temperature and open room thermostat 60. When either of these two conditions obtain, the circuit of the room thermostat 60 is opened and armature 107 is allowed to drop into engagement with contact 110 of the low flame circuit of heater 102. The low flame of heater 102 will continue until there is a further demand for heat at the room thermostat 60.

Fig. 7 illustrates a heating system whether of the warm air type or otherwise similar to the heating systems shown in Figs. 5 and 6 except that the circuit of relay 76 is connected across the circuit of the room thermostat 60 in advance of the actuating coil 65 of damper controller 66. This arrangement provides for more frequent operations of the high speed of blower 5 without necessitating acceleration of combustion each time the blower is thus operated. A furnace switch 112 adapted to close when the temperature of the furnace exceeds a predetermined degree, say, exceeds 150° Fahr., is inserted in wire 78. Wires 76 and 79 of the circuit of relay 78 are connected across the circuit of room thermostat 60 in advance of the terminals of draft controller 66, so that the high speed circuit of blower 5 will be energized to operate blower 5 at high speed whenever the furnace temperature is above say 150° Fahr. I find that this arrangement affords a very efficient heating action of furnace 1 because more heat may be taken from the furnace with less acceleration of combustion.

The temperatures mentioned of thermostats 64, 83 and 112 are merely illustrative of satisfactorily operating ranges and may be varied without deviating from the principles of operation hereindisclosed.

Fig. 8 represents substantially the same heating system shown in Fig. 7 except that a liquid fuel burner is shown in lieu of a solid fuel burner. As in Fig. 6, a relay 100 is substituted in the circuit of room thermostat 60 in lieu of the actuating coil 65 of draft controller 66. However, in this arrangement, device 102 is not provided with a high and low flame circuit. Armature 107 of relay 100 is adapted to move into circuit engaging position against contact 115 when this relay 100 is energized. The circuit is completed across armature 107, contact 115, wire 116, heater 102 and wire 117. It will be understood, of course that high and low flame circuits of device 102 shown in Fig. 6 may be provided in this instance, if found desirable, or that device 102 may be a combustion supporting device, such as a motor-driven blower or fan.

From the foregoing description, it will be understood that different parts of the system shown may be rearranged to meet existing conditions and demands for any particular installation without departing from the scope of the invention.

I broadly disclose employing a high and low speed motor that may be placed substantially into continuous operation either at high or at low speed so as to provide a continuous circulation of air from the furnace into the room, the amount of air being delivered depending upon the heating requirements of the demand for heat by room thermostat 60. I further broadly disclose controlling the substantially continuous operation of the blower 5 in accordance with the temperature of the furnace 1, this blower being arranged to operate substantially continuously between predetermined high and low furnace temperatures, whereby the blower will operate continuously at low speed when the temperature of the furnace is above said low degree but at high speed when the room thermostat calls for heat and closes its circuit to energize the combustion supporting means 66 or 102.

Without further elaboration, the foregoing will so fully explain the gist of my invention, that others may, by applying current knowledge, readily adopt the same for use under varying conditions of service, without eliminating certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

1. In a heating system, a furnace including a warm air duct, means for producing a forced draft for said warm air duct, thermostatic apparatus in the room to be heated, thermostatic apparatus at said furnace, and means controlled by said thermostatic apparatus for directing the forced draft to said warm air duct or diverting a portion of the forced draft to the furnace to increase the rate of combustion.

2. In a heating system, a furnace including a warm air duct, a device for supplying air to said warm air duct and to said furnace to increase

the rate of combustion, electrically operated means for controlling the flow of the air supply to said warm air duct and to said furnace, thermostatic apparatus responsive to the heat produced by said furnace, thermostatic apparatus in the room to be heated and connections between said electrically operated means and said thermostatic apparatus by means of which said electrically operated means may conduct the air supply to said warm air duct or may divert a portion of the air supply to said furnace.

3. In a heating system, a furnace including a warm air duct, a device for supplying air to said warm air duct and to said furnace to increase the rate of combustion, an electrical circuit including a room thermostat and a furnace thermostat, and an electrically operated damper controller in said circuit for controlling the direction of flow of said air supply.

4. In a heating system, a furnace including a warm air duct, a device for supplying air to said warm air duct and to said furnace to increase its rate of combustion, a room thermostat responsive to heat produced by said furnace, a furnace thermostat responsive to the heat of said furnace, an electrically operated controller, and connections between said thermostats and said controller for controlling the direction of flow of the air supply.

5. In a heating system, a furnace including a warm air duct, a motor, a variable speed blower driven by said motor, said blower being connected to said warm air duct and to the fire box of said furnace, electrically operated means for controlling the flow of air circulated by said blower, an electrical circuit in which said means is disposed, and thermostatic apparatus in said electrical circuit by means of which said blower operates at different speeds and said electrically operated means operates to connect said blower either with said warm air duct and with the fire box of said furnace, or with said warm air duct alone.

6. In a heating system, a furnace including a warm air duct, a motor, a variable speed blower driven by said motor producing a forced draft for said warm air duct and the fire box of said furnace, an electrical circuit, thermostatic apparatus controlling said circuit, control means in said circuit operated by said thermostatic apparatus for varying the speed of said blower, and means in said circuit for controlling the feed of the forced draft whereby to direct said forced draft to said warm air duct or to divert at times a portion of said forced draft to said fire box, the feed of the forced draft to said fire box being at a reduced speed of said blower, the feed of the forced draft to said warm air duct being at a higher speed of said blower upon a predetermined rise of furnace temperature.

7. In a heating system, a furnace including a warm air duct, a motor, a high and low speed blower driven by said motor producing a forced draft for said warm air duct and for the fire box of said furnace, an electrical circuit, thermostatic apparatus controlling said circuit, means in said circuit for controlling the speed of said blower, and means in said circuit for closing the draft to said fire box when said blower operates at high speed and for opening the draft to said fire box when said blower operates at low speed.

8. In a heating system, a furnace including a warm air duct, a motor, a high and low speed blower driven by said motor producing a forced draft for said warm air duct and for the fire box of said furnace, an electrical circuit, thermostatic apparatus responsive to room and furnace temperatures controlling said circuit, control means in said circuit to operate said blower at high speed when the furnace temperature exceeds a predetermined degree, and means in said circuit for closing the draft to said fire box when said blower operates at high speed.

9. In a heating system, a furnace including a warm air duct, a motor, a high and low speed blower driven by said motor producing a draft for said warm air duct and a draft for the fire box of said furnace, an electric circuit in which said blower is connected, a room thermostat in said circuit, a furnace thermostat in said circuit, control means in said circuit to operate said blower at high and low speeds, and means in said circuit for controlling the draft to said warm air duct and to said furnace fire box according to the condition of said thermostat and the speed of said blower.

10. In a heating system, a furnace including a warm air duct, a high and low speed blower producing a draft for said warm air duct and a draft for the fire box of said furnace, an electric circuit in which said blower is connected, control means in said circuit to operate said blower at high and low speeds, electrically operated means for opening and closing the draft to said furnace fire box, a thermostat in said circuit influenced by the furnace temperature, and a second thermostat for closing said circuit upon a predetermined drop of room temperature whereby, if the furnace is at a predetermined low temperature, said control means will operate said blower at low speed and said draft operating means will open the draft to said furnace fire box, and, if the furnace is at a predetermined high temperature, said control means will operate said blower at high speed and said damper operating means will close the draft to said furnace fire box.

11. In a heating system, a furnace including a warm air duct, a blower producing a warm air circulation for said duct and a forced draft for the fire box of said furnace, a control device for varying the speed of said blower, a thermostat responsive to furnace temperature for operating said control device whereby the speed of said blower will be increased by an increased temperature or hot condition of said furnace and will be lowered by a decreased temperature or cold condition of said furnace, means also operating according to the condition of said furnace thermostat for directing the blower discharge either solely to said warm air duct or partly to said furnace fire box and partly to said warm air duct, and a thermostat responsive to room temperature for controlling said furnace thermostat.

12. In a heating system, a furnace including a warm air duct, a blower producing a warm air circulation for said duct and a forced draft for the fire box of said furnace, a control device for varying the speed of said blower, a thermostat responsive to furnace temperature for operating said control device whereby the speed of said blower will be increased by an increased temperature or hot condition of said furnace and will be lowered by a decreased temperature or cold condition of said furnace, means also operating according to the condition of said furnace thermostat for directing the blower discharge either solely to said warm air duct or partly to said furnace fire box and partly to said warm air duct, a thermostat responsive to room temperature for controlling said furnace ther-

mostat, and means controlled by the humidity of the air in the room for controlling the humidity of the air delivered by said blower to said warm air duct according to the temperature conditions of said furnace.

13. In a heating system, a furnace including a warm air duct, a blower producing a warm air circulation for said duct and a forced draft for the fire box of said furnace, a control device for varying the speed of said blower, a thermostat responsive to furnace temperature for operating said control device whereby the speed of said blower will be increased by an increased temperature or hot condition of said furnace and will be lowered by a decreased temperature or cold condition of said furnace, means also operating according to the condition of said furnace thermostat for directing the blower discharge either solely to said warm air duct or partly to said furnace fire box and partly to said warm air duct, a thermostat responsive to room temperature for controlling said furnace thermostat, and means operable upon an increased furnace temperature and the discontinuation of the draft to said furnace fire box for controlling the humidity of the air supplied by said blower to said warm air duct.

14. In a heating system, a furnace including a warm air duct, means for producing a warm air circulation for said duct and a forced draft for the fire box of said furnace, a control device for varying the rate of discharge of said air circulating means, a furnace thermostat influenced by a cold and a warm condition of said furnace, said furnace thermostat operating said control device whereby the rate of discharge of said air circulating means will be increased by a hot furnace condition to be supplied solely to said warm air duct and will be lowered by a cold furnace condition to be supplied as a forced draft to said furnace fire box, and means controlling the direction of flow of the air discharged by said air circulating means according to said hot or cold condition of said furnace.

15. In a heating system, a furnace including a warm air duct, means for producing a warm air circulation for said duct and a forced draft for the fire box of said furnace, a control device for varying the rate of discharge of said air circulating means, a furnace thermostat influenced by a cold and a warm condition of said furnace, said furnace thermostat operating said control device whereby the rate of discharge of said air circulating means will be increased by a hot furnace condition to be supplied solely to said warm air duct and will be lowered by a cold furnace condition to be supplied as a forced draft to said furnace fire box, means controlling the direction of flow of the air discharged by said air circulating means according to said hot or cold condition of said furnace, and means acting independently of said furnace thermostat for setting said control device in a position causing said air circulating means to operate at said increased rate temporarily and provide a continuous increased air supply to said duct.

16. In a heating system, a furnace including a warm air duct, electrically operated means for producing a warm air circulation for said duct and a forced draft for the fire box of said furnace, a thermostat responsive to room temperature for controlling the circuit of said air circulating means, an electrically operated controller in circuit with said room thermostat for controlling the flow of air produced by said air circulating means whereby to supply the air to said duct and to said furnace fire box, a relay in circuit with said air circulating means, a thermostat responsive to warm and cold conditions of said furnace and controlling said relay to control the rate of discharge of said air circulating means, and means operable at said room thermostat and in the circuit of said relay to effect a temporarily increased rate of discharge of said air circulating means independently of the operation of said furnace thermostat.

17. In a heating system, a furnace including a warm air duct, electrically operated means for producing a warm air circulation for said duct and a forced draft for the fire box of said furnace, a thermostat responsive to room temperature for controlling the circuit of said air circulating means, an electrically operated controller in circuit with said room thermostat for controlling the flow of air produced by said air circulating means whereby to supply the air to said duct and to said furnace fire box, a relay in circuit with said air circulating means, a thermostat responsive to warm and cold conditions of said furnace and controlling said relay to control the rate of discharge of said air circulating means, means operable at said room thermostat and in the circuit of said relay to effect a temporarily increased rate of discharge of said air circulating means independently of the operation of said furnace thermostat, and means in circuit with said relay and operable when said relay is energized to effect an increased rate of discharge of said air circulating means for controlling the humidity of the air delivered by said blower according to the humidity conditions of the air in the room.

18. In a heating system, a furnace including a warm air duct for furnishing heated air to a room to be heated, a thermostat responsive to temperature variations of said room, means for producing an air circulation, means controlled by said thermostat for diverting a portion of said air circulation to the furnace as a forced draft to increase the rate of combustion, means operable upon a predetermined rise of furnace temperature to increase the capacity of said air circulating means to provide increased air circulation to said air duct and to discontinue the operation of said diverting means, and means continuing the operation of said air circulating means at a decreased capacity upon a predetermined rise of room temperature to maintain a constant air circulation to said room while said room thermostat is satisfied to prevent air stratification in said room.

19. In a heating system, a furnace including a warm air duct, means for producing a forced draft to said air duct to provide a constant circulation of air to a room to be heated to prevent stratification of the air therein, a thermostat responsive to temperature variations of said room, means controlled by said thermostat to divert a portion of said forced draft to said furnace upon a predetermined drop of room temperature to increase the rate of combustion in said furnace, and means controlling said air circulating means to provide an increased forced draft upon a predetermined rise of furnace temperature until the heat of said room rises to a predetermined temperature whereby to restore said air circulating means to its original operating capacity of a constant circulation of air to said room to prevent air stratification therein.

20. In a heating system, the combination of

apparatus for controlling the rate of combustion and the rate of supply of a heat conducting medium, thermostatic apparatus responsive to furnace temperature and the temperature of the room to be heated, and means between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to supply said heat conducting medium between predetermined low and high furnace temperatures and to accelerate the rate of supply of said heat conducting medium and the rate of combustion below a predetermined room temperature.

21. In a heating system, the combination of apparatus for controlling the rate of supply of a heat conducting medium, thermostatic apparatus responsive to furnace temperature and the temperature of the room to be heated, and means between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to supply said heat conducting medium between predetermined low and high furnace temperatures and to accelerate the rate of said supply below a predetermined room temperature.

22. In a heating system, the combination of apparatus for controlling the rate of supply of a heat conducting medium, thermostatic apparatus responsive to furnace temperature, and means between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to supply said heat conducting medium between predetermined low and intermediate furnace temperatures and to accelerate the rate of said supply between said intermediate and a predetermined high furnace temperature.

23. In a heating system, the combination of apparatus for controlling the rate of supply of a heat conducting medium; thermostatic apparatus responsive to furnace temperature and the temperature of the room to be heated, and means between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to supply said heat conducting medium between predetermined low and intermediate furnace temperatures, to accelerate the rate of said supply between said intermediate and a predetermined high furnace temperature, and, irrespective of said intermediate furnace temperature, to accelerate the rate of said supply between said predetermined low and high furnace temperatures when said room tmperature drops below a predetermined degree.

24. In a heating system, a heater, an electrically operated device for controlling the rate of combustion at said heater, thermostat responsive to the temperature of the room to be heated, a thermostat responsive to a predetermined high temperature of said heater, a circuit including in series relation said combustion controlling device and said room and furnace thermostats, electrically operated means for controlling the rate of supply of a heat conducting medium, a two speed circuit for said medium controlling means, and connections between said circuits including a second furnace thermostat responsive to predetermined low furnace temperature by means of which said medium controlling means operates at low and high speeds to supply said heat conducting medium to the room to be heated according to furnace and room temperatures.

25. In a heating system, a heater, means for supplying a heat conducting medium at a predetermined rate to the room to be heated, a thermostat responsive to the temperature of the room, means controlled by said room thermostat to decrease said rate of supply of said heat conducting medium when said room thermostat calls for heat, and means controlled by the temperature of said heater and operable during the period said room thermostat is calling for heat for restoring the rate of supply of said heat conducting medium and for accelerating the same beyond said predetermined rate.

26. In a heating system, a heater, means for supplying a heat conducting medium at a predetermined rate to the room to be heated, a thermostat responsive to the temperature of the room, means controlled by said room thermostat to decrease said predetermined rate of supply of said heat conducting medium when said room thermostat calls for heat, means controlled by the temperature of said heater and operable during the period said room thermostat is calling for heat for restoring said predetermined rate of supply of said heat conducting medium and to accelerate the same beyond said predetermined rate, and means for discontinuing the supply of said heat conducting medium when the temperature of said heater drops below a predetermined low temperature.

27. In a heating system, a heater, means for supplying a forced circulation of a heat conducting medium at a predetermined rate to the room to be heated, a room thermostat responsive to the temperature of the room, and control means responsive to the temperature of said heater for said supply means whereby said heat conducting medium will be supplied at said predetermined rate when said room thermostat is satisfied and will be supplied at an increased rate when said room thermostat calls for heat and said heater is above a predetermined temperature.

28. In a heating system, a heater, means for supplying a heat conducting medium at a predetermined rate to the room to be heated, a room thermostat responsive to the temperature of the room, control means responsive to the temperature of said heater for said supply means whereby said heat conducting medium will be supplied at a predetermined rate when said room thermostat is satisfied and will be supplied at an increased rate when said room thermostat calls for heat, and means operable when said heat conducting medium is supplied at said increased rate for controlling the humidity of the air in the room.

29. In a heating system, a heater, a multi-speed blower for supplying a heat conducting medium from said heater to a room to be heated, a thermostat responsive to the temperature of the room, and means including a thermostat responsive to the temperature of said heater and controlled by said room thermostat for controlling said multi-speed blower whereby to operate said multi-speed blower at a predetermined rate or at an accelerated rate.

30. In a heating system, a heater, a multi-speed blower for supplying a heat conducting medium from said heater to a room to be heated, a thermostat responsive to the temperature of the room, means including a thermostat responsive to the temperature of said heater and controlled by said room thermostat for controlling said multi-speed blower whereby to operate said multi-speed blower at a predetermined rate or at an accelerated rate, and means operable when said heat conducting medium is sup-

plied at said accelerated rate for controlling the humidity of the air in the room.

31. In a temperature controlling system, a heater, multi-speed circulating means for supplying a forced circulation of a heat conducting medium at different rates of flow from said heater to a room to be heated, a thermostat responsive to the temperature of the room, control mechanism associated with said room thermostat and controlling said circulating means at different speeds whereby to supply said heat conducting medium at different rates of flow to maintain the room substantially at a predetermined heated temperature, and means associated with said control mechanism for actuating said circulating means when the temperature of the room exceeds a predetermined temperature whereby to supply said medium at an unheated temperature to the room to maintain the room at a predetermined cool temperature.

32. In a temperature controlling system, a heater, means for supplying a heat conducting medium from said heater to a room to be heated, a thermostat responsive to the temperature of the room in circuit with said supply means, means responsive to the temperature of said heater and in circuit with said supply means and said room thermostat by means of which said heat conducting medium will be supplied at a predetermined rate when the temperature of said heater is at predetermined low temperature but will be supplied at an accelerated rate when the temperature of said heater rises above said predetermined low temperature, and means in circuit with said room thermostat and said heater responsive means for disabling the operation of said supply means at said predetermined rate but continuing the operation of said supply means at said accelerated rate whereby to supply said heat conducting medium as a cooling medium to the room when the temperature of the room exceeds a predetermined high temperature.

33. In a heating system, a heater, high or low rate combustion producing means for said heater, means for supplying a heat conducting medium from said heater at different rates to a room to be heated, a thermostat responsive to the temperature of the room, a thermostat responsive to the temperature of said heater, and control devices for said combustion producing means and said supply means associated with said thermostats whereby said combustion producing means may operate at a predetermined low or high rate, and said supply means may operate at a predetermined normal or accelerated rate, the rate of operation of said combustion producing means being controlled by predetermined room temperatures and the rate of operation of said supply means being controlled by predetermined furnace temperatures.

34. In a heating system, a furnace, a high and low speed blower to provide a circulation of air to a room to be heated, a thermostat responsive to the temperature variations of said room, a thermostat responsive to the temperature variations of said furnace, and connections between said blower and said furnace thermostat for controlling the operation of said blower at high speed above a predetermined furnace temperature and at low speed below said predetermined furnace temperature.

35. In a furnace control, the combination of apparatus of variable capacity for controlling the rate of supply of a heat conducting medium to a room to be heated, thermostatic apparatus responsive to furnace temperature and to room temperature, and connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates at different capacities to supply the heat conducting medium to said room, said furnace thermostatic apparatus operating said control apparatus to supply the heat conducting medium at one capacity below a predetermined furnace temperature and at another capacity above said predetermined furnace temperature.

36. In a system of the class described, means for supplying a heat transfer medium to a room, a control device for operating said supply means to supply said heat transfer medium at a predetermined rate or at an accelerated rate, a thermostat responsive to the temperature of the room for controlling the operation of said control device, a heater for said heat transfer medium, a thermostat responsive to the temperature of said heater, and mechanism for placing said control device under the operation of said furnace thermostat when said heater is functioning to heat said heat transfer medium or under the operation of said room thermostat when said heater is not functioning and the heat transfer medium is used as a cooling medium for the room.

37. In a system of the class described, means for supplying a heat transfer medium to a room, control means for operating said supply means to supply said heat transfer medium at a predetermined rate and at an accelerated rate, thermostatic apparatus responsive to the temperature of the room for effecting operation of said supply means, a heater for said heat transfer medium, means for controlling the operation of said heater, and thermostatic apparatus responsive to the temperature of said heater for controlling the operation of said control means whereby to supply said heat transfer medium at said predetermined rate and at said accelerated rate according to predetermined heater conditions, said heater thermostatic apparatus having provisions for controlling the operation of said heater control means according to heater conditions independent of the heater conditions controlling the operation of said supply means.

38. A temperature control system of the class described, comprising, in combination, a circulator for circulating a fluid medium to a space the temperature of which it is desired to control, means responsive to the temperature of the fluid medium for operating said circulator at a low speed whenever the temperature of the fluid medium is at a given value, and means responsive to the temperature of the space for operating said circulator at a higher speed when the space temperature diverges from a predetermined value.

39. In a temperature control system, an electrically operated circulator for circulating a fluid medium, a switch responsive to the temperature of the fluid medium, circuit connections controlled by said switch for operating said circulator at one speed when said switch is closed, a thermostatic switch responsive to a temperature condition other than that of the circulating medium, and circuit connections for operating said circulator at another speed when both said switches are closed.

40. The combination with a warm air furnace and an electrically operated circulator for circulating the air heated thereby, of means in control of the supply of heat to said air, a switch

responsive to the temperature of said air and closed when the temperature thereof is above a predetermined minimum value, a circuit for operating said circulator at low speed controlled by said switch, a room thermostat, and connections between said room thermostat, heat supply controlling means and circulator for increasing the supply of heat to said air and for operating said circulator at a higher speed when the room temperature falls below a predetermined value.

41. A temperature control system of the class described, comprising in combination, circulation controlling means in control of the flow of a fluid medium for changing the temperature of a space, means responsive to the temperature of the fluid medium to operate the circulation controlling means to produce a predetermined flow of fluid whenever the temperature of the fluid medium is at a given value, and space temperature responsive means to operate the circulation controlling means to produce a different flow of fluid when the space temperature is at a given value, said fluid medium temperature responsive means preventing operation of the circulation controlling means by the space temperature responsive means if the temperature of the fluid medium is not at said given value.

42. In a system for heating and humidifying a space to be controlled, in combination, means to deliver air to the space, means to heat said air, means to add moisture to the air, means responsive to the humidity of the space in control of said moisture adding means, means responsive to the temperature of the air in control of the air circulating means to increase the circulation of air to the space and to permit control of the moisture adding means by the humidity responsive control only when the temperature of the air is sufficiently high, and means responsive to the temperature of the space in control of the means to heat the air to raise the temperature thereof when the temperature of the space becomes too low.

43. In combination, a heater for heating air delivered to a space, electrical means in control of the heater, a space thermostat in control of said heater controlling means to increase the heating of the air when the space temperature becomes too low, electrical means to circulate the heated air to the space, an air temperature responsive switch in control thereof to increase the circulation of air to the space when the temperature of the air becomes sufficiently high, electrical means to add moisture to the air, a space humidity responsive switch, and circuit connections controlled by the conjoint action of said switches in control of said electrical moisture adding means.

44. In a temperature controlling system, a heater, multi-speed circulating means for supplying a forced circulation of a fluid medium from said heater to a room to be heated, a thermostat responsive to the temperature of the room, control mechanism controlled by said thermostat and operating said circulating means at high speed upon a drop of room temperature to a predetermined point and at low speed upon a rise of room temperature to a predetermined point, and means for reversing the action of the parts for causing said circulating means to operate at high speed upon a rise of room temperature to a predetermined point and at low speed upon a drop of room temperature to a predetermined point.

45. In a temperature control system of the class described, a heater, a multi-capacity blower device operable at low and high speeds for circulating a fluid medium heated thereby, an electrically operated control device adapted when deenergized for operating said blower device at low speed, a thermostatic switch responsive to the temperature of the fluid medium, a second thermostat switch responsive to room temperature, and circuit connections energizing said control device to operate said blower device at high speed when both said thermostatic switches are closed.

46. In a temperature control system of the class described, a heater, multi-speed circulating means operable at low and high speeds for circulating a fluid medium heated thereby, an electrically operated control device having low and high speed contacts in circuit with said circulating means, a thermostat responsive to room temperature, a thermostat responsive to the temperature of said fluid medium, and circuit connections for energizing said control device to close said high speed contact and to operate said circulating means at high speed when both said thermostats are actuated.

47. In a temperature control system of the class described, a heater, multi-speed circulating means operable at low and high speeds for circulating a fluid medium heated thereby, a control circuit for said circulating means having low and high speed contacts, a control device for closing said low speed contact when deenergized and for closing said high speed contact when energized, a thermostat responsive to the temperature of the fluid medium adapted to close at a predetermined temperature of said fluid medium, and a thermostat responsive to room temperature, the closing of said room thermostat energizing said control device to operate said circulating means at high speed when said fluid responsive thermostat is closed, the opening of said room thermostat deenergizing said control device to operate said circulating means at low speed when said fluid responsive thermostat is closed.

48. In a temperature control system of the class described, a heater, multi-speed circulating means operable at low and high speeds for circulating a fluid medium heated thereby, low and high speed contacts for said circulating means, a relay, a switch arm for closing said low speed contact when said relay is deenergized and for closing said high speed contact when said relay is energized, a thermostat responsive to the temperature of the fluid medium adapted to close at a predetermined temperature of the fluid medium, and a second thermostat responsive to room temperature adapted to close upon a predetermined drop of room temperature to energize said relay and to close said high speed contact.

49. In a heating system, a heater, combustion producing means for said heater, means for circulating a heat conducting medium from said heater to a room to be heated, a thermostat responsive to the temperature of the room for controlling the operation of both said means, a thermostat responsive to a predetermined high temperature of said heater and in circuit with said room thermostat for controlling the operation of said combustion producing means whereby to check or to accelerate the rate of combustion at said heater, and means also controlled by the thermostat of said heater for controlling the operation of said circulating means whereby to circulate said heat conducting medium at a

predetermined rate of flow or at an accelerated rate of flow.

50. A summer-winter control system of the class described, in combination, a heat increasing means for heating a fluid medium to be circulated to a space to be heated, a low and high speed circulator for circulating said fluid medium at different rates of flow, a space thermostat for operating said heat increasing means and for operating said circulator at high speed upon a drop of space temperature in the winter, thermostatic apparatus responsive to the temperature of the fluid medium controlling the operation of said space thermostat, said thermostatic apparatus discontinuing the control of said space thermostat over said circulator upon a drop of temperature of the fluid medium to a predetermined point and preventing the operation of said heat increasing means by said space thermostat to increase the temperature of the fluid medium when the temperature thereof is above a predetermined value, and mechanism for changing the arrangement of the parts in such a manner as to cause operation of said circulator at low speed during normal space temperatures in the summer and to cause operation of said circulator at high speed in the summer when the space temperature becomes too high, said mechanism including means for changing the operative relation of said thermostatic apparatus with respect to said space thermostat so that said heat increasing means cannot be operated by said space thermostat and said circulator may always be operated by said space thermostat irrespective of normal fluctuations in the temperature of the fluid medium.

51. A summer-winter control system of the class described, in combination, a heater for heating a fluid medium to be circulated to a space to be heated, high and low speed circulating means for circulating said fluid medium at different rates of flow, a space thermostat and a thermostat responsive to the temperature of the fluid medium for controlling the operation of said high and low speed circulating means in the winter, and mechanism for changing the arrangement of the parts in such a manner as to cause high speed operation only in the summer when the space temperature becomes too high, said mechanism including means for changing the operative relation of said fluid medium thermostat with respect to the remaining parts so that said circulating means may always be operated by said space thermostat and for disconnecting the low speed operation of said circulating means.

52. A summer-winter control system of the class described, in combination, a heater for heating a fluid medium to be circulated to a space to be heated, high and low speed circulating means for circulating said fluid medium at different rates of flow, a space thermostat for operating said circulating means at high speed upon a fall of space temperature in the winter and at low speed upon a rise of space temperature in the winter, thermostatic apparatus for controlling the operation of said space thermostat in accordance with temperature fluctuations of the heating medium at said heater, and mechanism for changing the arrangement of the parts in such a manner as to cause high speed operation of said circulating means upon a rise of temperature in the summer and low speed operation of said circulating means upon a drop of temperature in the summer, said mechanism including means for changing said thermostatic apparatus from operative control of said space thermostat so that said circulating means may always be operated by said space thermostat irrespective of the temperature fluctuations of the fluid medium.

53. In a temperature controlling system, a heater, means for supplying a heat conducting medium from said heater to a room to be heated, a thermostat responsive to the temperature of the room for controlling said supply means, means responsive to the temperature of said heater and associated with said supply means and said room thermostat by means of which said heat conducting medium will be supplied at a predetermined rate when the temperature of said heater is at predetermined low temperature but will be supplied at an accelerated rate when the temperature of said heater rises above said predetermined low temperature, and means associated with said room thermostat and said heater responsive means for disabling the operation of said supply means at said predetermined rate but continuing the operation of said supply means at said accelerated rate whereby to supply said heat conducting medium as a cooling medium to the room when the temperature of the room exceeds a predetermined high temperature.

54. In a heating system, a heater, a thermostat responsive to the temperature of said heater, a thermostat responsive to the temperature of a room, and multi-capacity circulating means for supplying a heating medium from said heater to said room, the capacity of said multi-capacity circulating means being controlled by said heater and room thermostats.

55. In a heating system, a heater, means for supplying a forced circulation of a heat conducting medium at a predetermined rate to the room to be heated, a thermostat responsive to the temperature of the room, means controlled by said room thermostat to increase said rate of supply of said heat conducting medium when said room thermostat calls for heat, and means controlled by the temperature of said heater and operable during the period said thermostat is calling for heat for restoring the said predetermined rate of supply of said heat conducting medium.

56. In a heating system, a heater, means for supplying a forced circulation of a heat conducting medium at a predetermined rate to the room to be heated, a thermostat responsive to the temperature of the room, means controlled by the temperature of said heater to increase said predetermined rate of supply of said heat conducting medium when said room thermostat calls for heat, said means also being operable during the period said room thermostat is calling for heat for restoring said predetermined rate of supply of said heat conducting medium or again to increase the same beyond said predetermined rate, and means for discontinuing the supply of said heat conducting medium when the temperature of said heater drops below a predetermined low temperature.

57. In a temperature controlling system, a heat increasing means, a circulation controlling device for the fluid heated by said heat increasing means, a room thermostat responsive to the temperature of the room, connections between said room thermostat and said heat increasing means for causing heating of the fluid upon a fall in room temperature and for preventing such heating thereof when the room temperature has been restored, and means responsive to the temperature of the circulating fluid for causing circulation of the fluid upon a rise in temperature thereof to a pre-

determined point and continuing such circulation thereof irrespective of the temperature of the room or condition of said room thermostat as long as the temperature of the fluid is above said predetermined point.

58. In a heating system, a heater, heat increasing means for supplying heat to said heater to heat a circulating medium, circulating means for causing a forced circulation of said circulating medium to a space to be heated, a thermostat responsive to the temperature of said space for operating said heat increasing means to increase the temperature of said heater upon a fall of space temperature; thermostatic apparatus responsive to temperature of said heater for preventing the operation of said heat increasing means if the temperature of said heater is above a predetermined maximum, and thermostatic apparatus also responsive to the temperature of said heater for operating said circulating means when the temperature of said heater is above a predetermined value, said circulating means operating to circulate said medium above said maximum heater temperature irrespective of the condition of said space thermostat.

59. In a heating system, a heater, heat increasing means for supplying heat to said heater to heat a circulating medium, circulating means for causing a forced circulation of said circulating medium to a space to be heated, and thermostatic apparatus responsive to heater and space temperatures for operating said circulating means when the temperature of said heater is above a predetermined value and for operating said heat increasing means upon a drop of space temperature below a predetermined value but to prevent such operation of the heat increasing means above a predetermined high heater temperature, said thermostatic apparatus operating said circulating means above said predetermined high heater temperature.

60. In a heating system, a heater, heat increasing means for supplying heat to said heater to heat a circulating medium, circulating means for causing a forced circulation of said circulating medium to a space to be heated, and thermostatic apparatus including connections between said thermostatic apparatus and said circulating means by means of which said circulating means is prevented from operating whenever the temperature of the circulating medium is too low, is operated at low speed whenever the temperature of the fluid medium is at or above a predetermined value and the space to be heated is at or above a predetermined temperature, is operated at high speed when the fluid medium is at or above said predetermined value but the space is below said predetermined temperature, and is operated at high speed whenever the space is at or above said predetermined temperature but the temperature of the fluid medium is excessive.

61. In a heating system, a heater, heat increasing means of different operating capacities for supplying heat to said heater to heat a circulating medium, circulating means for causing a forced circulation of said circulating medium to a space to be heated, connections for causing operation of said heat increasing means at a low capacity to supply minimum heat to said circulating medium above a predetermined temperature of said space to be heated, thermostatic apparatus responsive to the temperature of said circulating medium for causing operation of said circulating means to effect a forced circulation thereof above a predetermined temperature thereof, and thermostatic apparatus responsive to the temperature of said space to be heated for causing operation of said heat increasing means at a higher capacity to supply additional heat to said circulating medium upon a drop of temperature below said predetermined temperature of said space.

62. In a heating system, a heater for heating a circulating medium, conducting means for permitting circulation of said circulating medium for heating a space, circulating means for causing forced circulation of said circulating medium through said conducting means, means for maintaining at all times a predetermined heater temperature whereby slow circulation of the circulating medium through the conducting medium is caused, means responsive to space temperature to increase the heater temperature when the space temperature falls below a predetermined value, and means responsive to heater temperatures to operate said circulating means when the heater temperature reaches a value above a predetermined temperature whereby forced circulation of the circulating medium through said conducting means is provided to heat said space.

63. In a heating system, a heater for heating a circulating medium, conducting means for permitting circulation of said circulating medium for heating a space, circulating means for causing forced circulation of said circulating medium through said conducting means, means for maintaining at all times a predetermined heater temperature whereby slow circulation of the circulating medium through the conducting medium is caused, means responsive to space temperature to increase the heater temperature when the space temperature falls below a predetermined value, means responsive to heater temperature to operate said circulating means when the heater temperature reaches a value above a predetermined temperature whereby forced circulation of the circulating medium through said conducting means is provided to heat said space, and means responsive to a predetermined high heater temperature for rendering said heater temperature increasing means inoperative but permitting operation of said circulating means.

64. In a heating system, a heater for heating a circulating medium, conducting means for permitting circulation of said circulating means for heating a space, circulating means for causing forced circulation of said circulating medium through said conducting means, low and high flame means for controlling the temperature of said heater, means to operate said low and high flame means for maintaining at all times a predetermined heater temperature whereby slow circulation of the circulating medium is caused, means responsive to space temperatures to operate said low and high flame means to increase the heater temperature when the space temperature falls below a predetermined value, and means responsive to heater temperature to operate said circulating means when the heater temperature reaches a predetermined temperature value whereby forced circulation of the circulating medium through said conducting means is provided to heat said space.

65. A heating system including a furnace comprising, in combination, means for increasing the rate of combustion, means for circulating a heat conducting medium heated by said combustion increasing means, thermostatic apparatus responsive to room temperature, thermostatic apparatus responsive to furnace temperature, connections between said combustion increasing

means and said room and furnace thermostatic apparatus for operating said combustion increasing means to supply heat to said medium upon a predetermined drop of room temperature and for preventing such operation when the furnace temperature is at or above a predetermined high limit, and connections between said medium circulating means and said furnace thermostatic apparatus for operating said medium circulating means to circulate said medium during normal operating temperatures of the furnace and continuing without interruption beyond normal high temperature of the furnace whereby said medium is continuously supplied to the room to maintain constant circulation of the heater air therein.

66. In a furnace control, the combination of a variable speed blower for controlling the rate of supply of a heat conducting medium to a room to be heated, furnace and room thermostatic apparatus responsive to furnace and room temperatures, and means controlled by said thermostatic apparatus for operating said blower at different speeds according to predetermined furnace and room temperatures and for continuing operation of said blower at one of said speeds when said room thermostat is ineffective.

67. In a heating system, the combination with a heater, of combustion producing means for said heater, a thermostat responsive to temperature of a room to be heated, a thermostat responsive to the temperature of said heater, connections between said combustion producing means and both said thermostats for operating said combustion producing means below a predetermined furnace temperature when said room thermostat is actuated by a drop of room temperature below a predetermined degree, means for circulating a heat conducting medium from said heater to the room, connections between said circulating means and said room thermostat for operating said circulating means whereby said heating conducting medium will be supplied to the room at a predetermined volume, and control means associated with said connections and said room thermostat for causing said circulating means to continue operating after said room thermostat is satisfied by a rise of temperature above said predetermined degree whereby said heat conducting medium will be supplied at a reduced volume to the room as long as said room thermostat remains satisfied.

68. A heating circulating system comprising, a heater, a circulating system for conducting a heating medium from said heater to a space to be heated, means for inducing circulation of said heating medium in said circulating system, means for automatically causing operation or cessation of said circulation inducing means when said heater is above or below, respectively, a predetermined temperature, and means for automatically varying the delivery capacity of said circulation inducing means responsive to temperature changes in the space to be heated.

JOHN S. BAKER.

Feb. 4, 1941. J. S. BAKER 2,230,446

AUTOMATIC CONTROL SYSTEM FOR WARM AIR FURNACES

Filed July 16, 1934 4 Sheets-Sheet 2

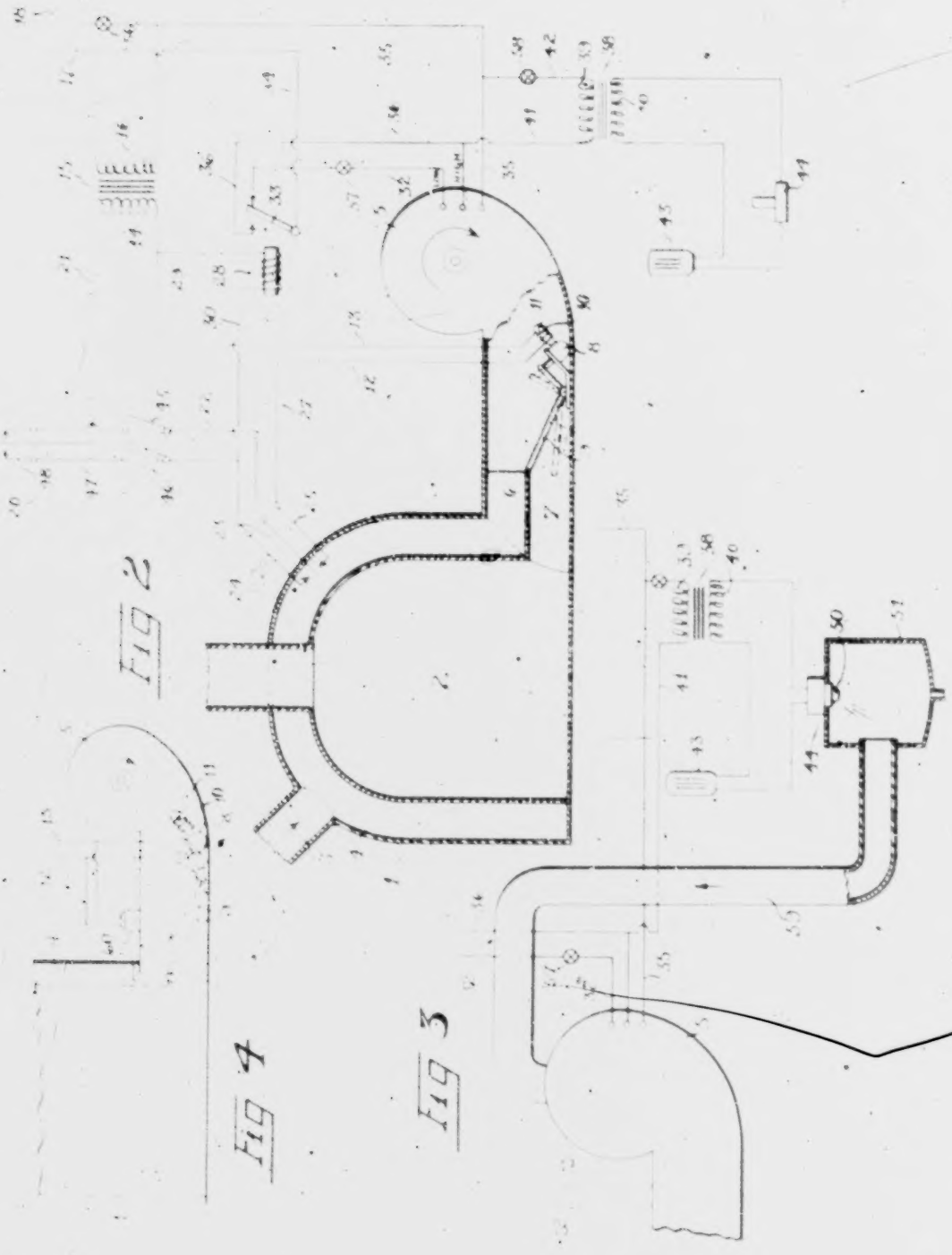


FIG 2

FIG 3

FIG 4

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AUTOMATIC CONTROL SYSTEM FOR WARM AIR FURNACES

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Fig. 5

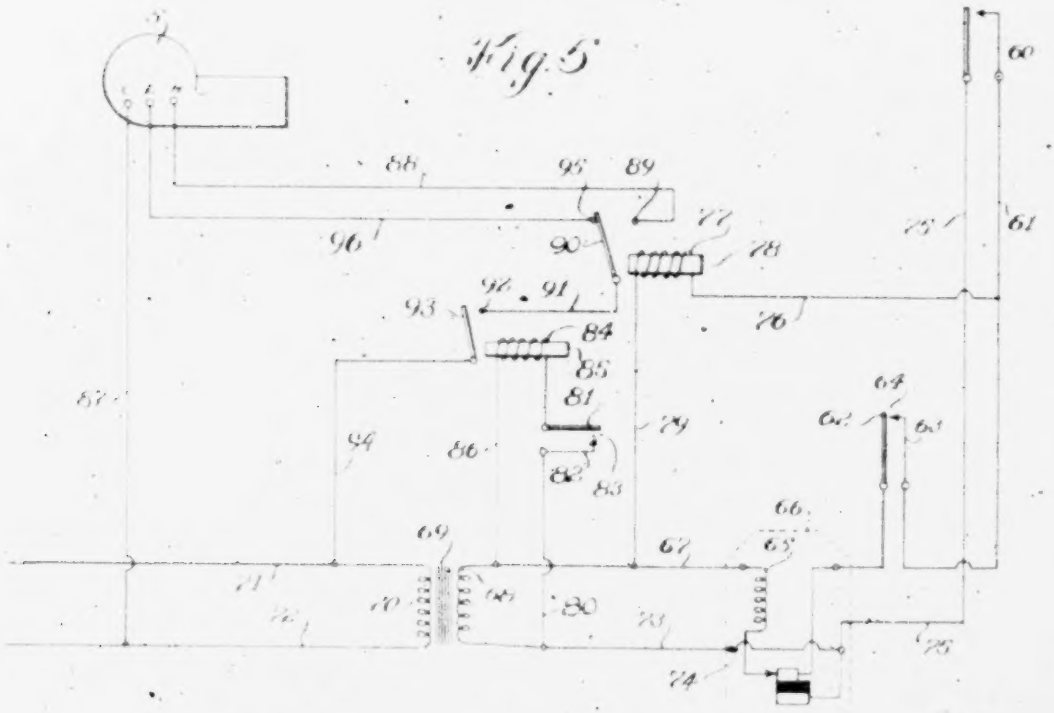
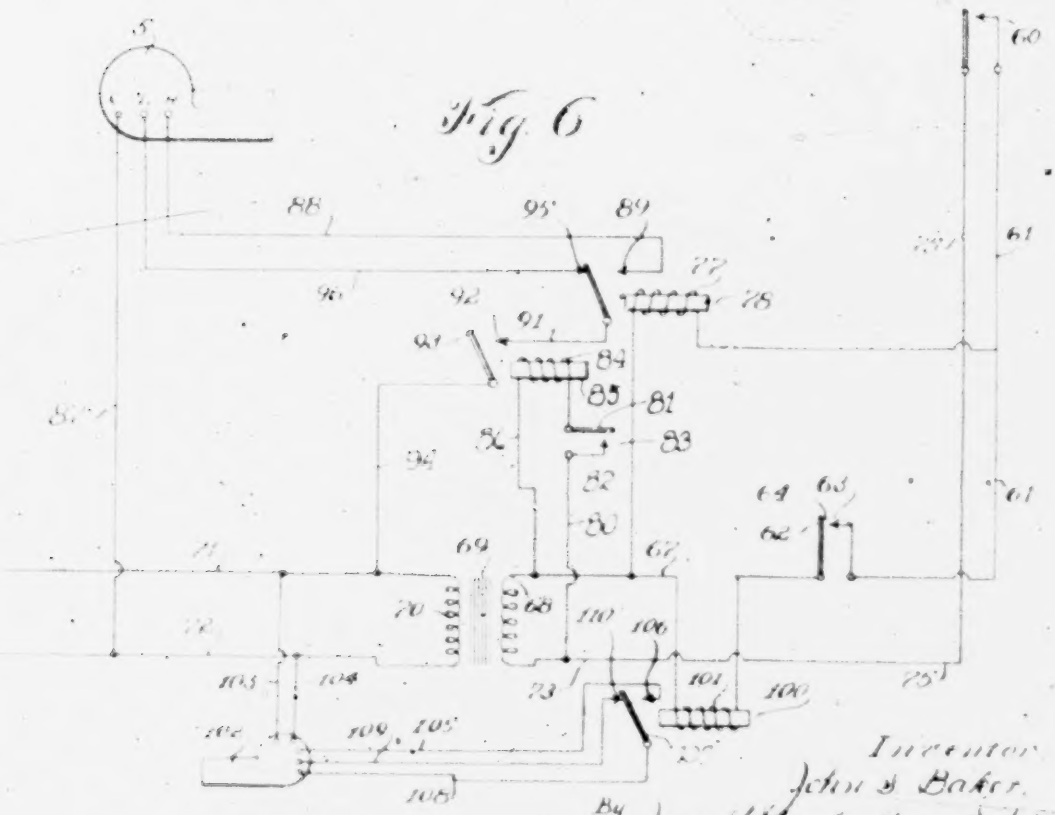


Fig. 6



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AUTOMATIC CONTROL SYSTEM FOR WARM AIR FURNACES

Filed July 16, 1934 4 Sheets-Sheet 4

Fig. 7

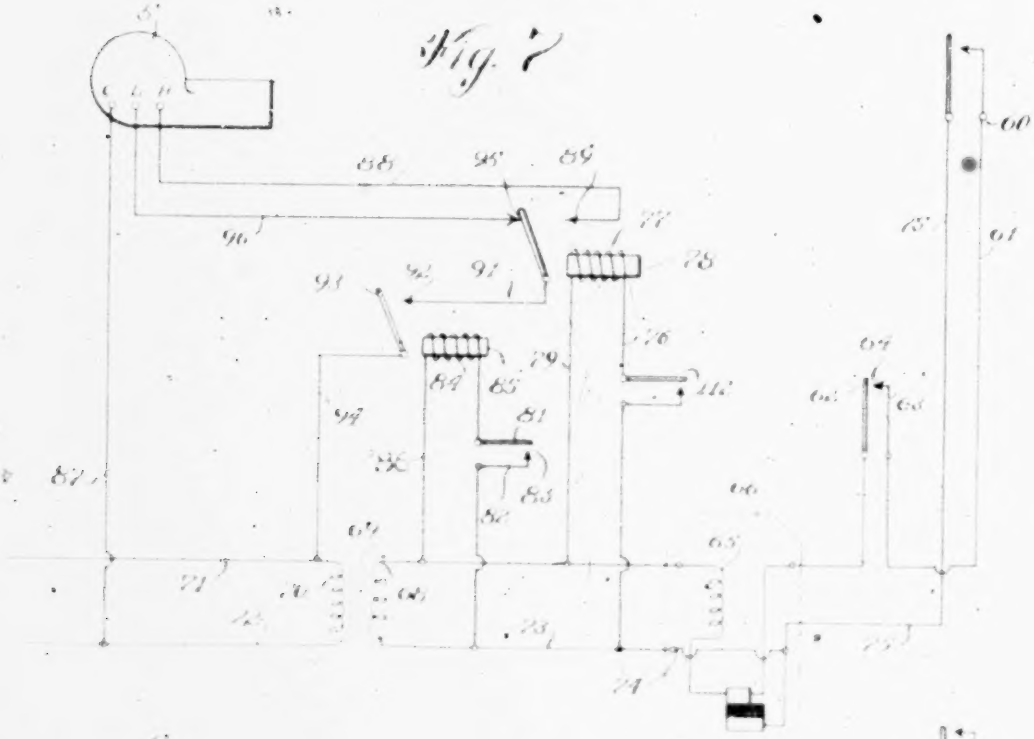
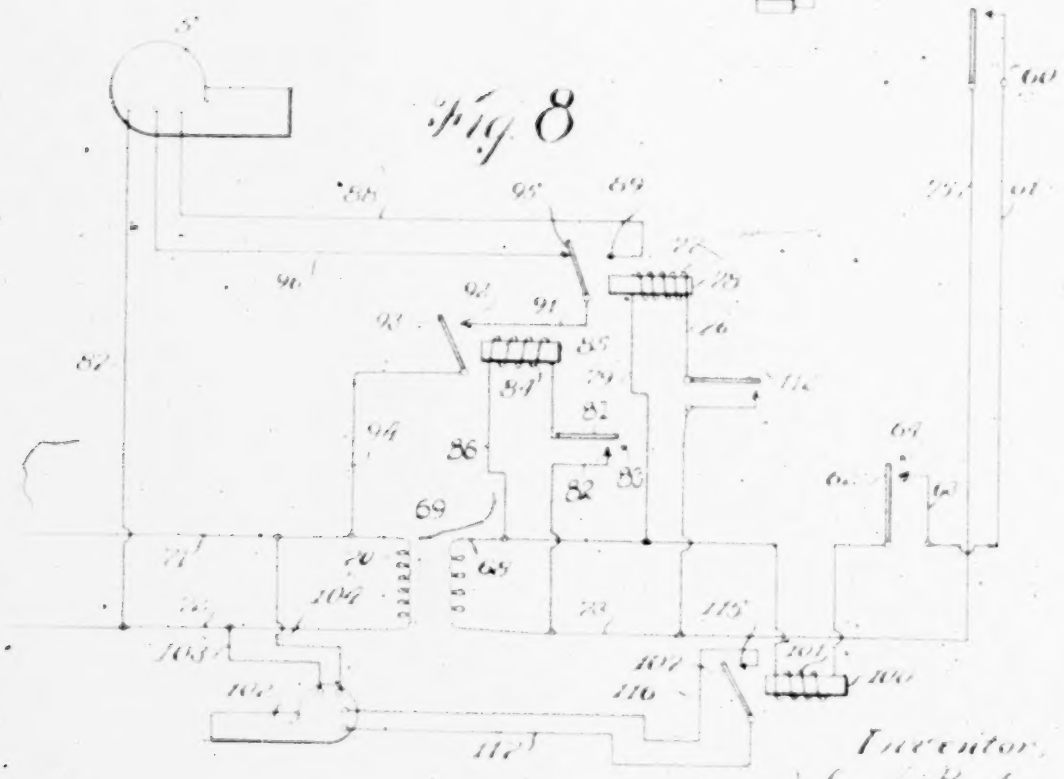


Fig. 8



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UNITED STATES PATENT OFFICE

2,230,446

AUTOMATIC CONTROL SYSTEM FOR WARM AIR FURNACES

John S. Baker, Chicago, Ill., assignor to Cook Electric Company, Chicago, Ill., a corporation of Illinois

Application July 16, 1934, Serial No. 735,457

68 Claims. (Cl. 236—9)

This application is a continuation in part of my abandoned application 645,555 filed Dec. 3, 1932.

This invention relates to control apparatus principally for use with a warm air furnace.

More particularly, this invention relates to control appafatus adapted for use with warm air furnaces wherein forced drafts are utilized to support combustion and to bring heated air from the furnace into the room, the apparatus being preferably under the control of a thermostat in the room. It will be understood, however, that the invention is not limited to warm air furnaces utilizing forced drafts to support combustion, and to supply heated air to the room, but may be used in ordinary heating systems employing equivalent instrumentalities of control for maintaining a relatively uniform room temperature.

In heating systems employing warm air furnaces, as heretofore provided, it has been customary to maintain the control of the furnace under the room thermostat and intermittently increase the rate of combustion as the room temperature drops and the thermostat calls for heat. It has been found, however, that intermittent operation of the heating system results in air stratification, with a temperature of 70° Fahr. (for example) in the region of the thermostat, which will satisfy the thermostat, and a lower temperature of several degrees at or directly above the floor. This condition is known as a "cold 70," is very undesirable and may be overcome chiefly by the use of a forced circulation. On the other hand, in view of poor conditions of chimneys and the uncertainties and variations of them, natural drafts have been found at times to be insufficient to secure proper combustion, particularly when outside conditions might tend to check a natural draft, although the room thermostat might be calling for heat and the outside temperature low enough to require a prompt response by the furnace to increase the combustion in order to prevent serious chilling of the room. Forced drafts for increasing combustion have been employed, however, but difficulty has been experienced in securing a heating system satisfactorily combining a forced circulation for bringing the heated air into the room to prevent stratification of the air and a "cold 70," and maintain a proper warm air circulation during the heating of the room, with a forced draft for increasing the rate of combustion of the furnace sufficiently to prevent chilling of the room when the thermostat calls for heat.

An object of the invention, therefore, resides in an improved control apparatus adapted particularly for warm air heating systems in which a blower or the like may operate to furnish a forced draft, both to the furnace and warm air duct leading to the room or rooms to be heated, or to the warm air duct alone, either at high or low speeds, depending upon the temperature of the furnace bonnet at the time the room thermostat calls for heat.

A further object of the invention resides in providing improved control apparatus of this type capable of regulating the speed of operation of the blower, or other means furnishing the forced draft, whereby to obtain the proper forced draft and operation of the furnace and to maintain a relatively uniform room temperature at all times.

A further object of the invention resides in providing an electrical system wherein thermostatic means responsive to furnace temperature may control the operation of the blower or draft producing means, either to increase the rate of combustion or to increase the rate of delivery of heated air into the room.

A further object of the invention resides in providing an improved forced draft control of the type above described adapted for summer or winter use wherein the temperature of the room may be lowered and the air more effectively cooled in the summer months by keeping the air in constant circulation.

A still further object of the invention resides in control apparatus for warm air heating systems which includes humidity control means adapted to operate at such times as to supply proper amounts of moisture to the warm air and maintain the humidity of the room to be heated at a predetermined value, there being means to operate the humidity control means according to humidity conditions and temperature requirements of the room.

A still further object of the invention resides in control apparatus for warm air heating systems in which humidity control means may be employed to accomplish the results above mentioned, yet capable of use with a summer control arranged effectively to cool the room by keeping the air in circulation and to wash the air, if so desired, to maintain a relatively lower temperature, or a relatively uniform cool temperature.

Other objects and advantages of the invention

will be apparent from the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a view partly diagrammatic and partly structural of a two-wire circuit and apparatus embodying the invention;

Fig. 2 is a similar view illustrating a three-wire circuit permitting the use of a winter and summer control;

Fig. 3 is a detailed view of one form of humidity control particularly adapted for summer use;

Fig. 4 is a detailed view illustrating an oil or gas fired furnace connected in a system embodying the present invention;

Fig. 5 is a wiring diagram of a further embodiment of the invention;

Fig. 6 is a wiring diagram illustrating an oil or gas-fired furnace connected in this further embodiment of the invention;

Fig. 7 is a wiring diagram illustrating a still further embodiment of the invention; and

Fig. 8 is a wiring diagram illustrating an oil or gas-fired furnace used in the system shown in Fig. 7.

It may be mentioned at the outset that I contemplate employing a single blower so associated with control apparatus as to maintain a constant circulation of air at low speed through the warm air duct of the furnace and to the rooms until the room thermostat calls for heat. When the room thermostat calls for heat, the control apparatus acts to divert a portion of the blower discharge into the fire box of the furnace to act as a forced draft and to allow the remaining air from the blower to continue circulating through the duct and into the room, which tends, of course, to lower the normal circulation and produce a sensible feeling of a rising temperature. When the forced draft increases the combustion and raises the furnace temperature, the control apparatus acts to increase the speed of the blower to increase the velocity of its discharge as well as to discontinue the forced draft to the furnace. All the air circulated by the blower at high speed will pass through the warm air duct into the room until the room thermostat has been satisfied and its circuit opened. By arranging the control apparatus to keep the blower continuously operating, there will be a constant flow of air through the bonnet of the furnace, which will prevent any overheating and serious damage of the furnace, or which, in summer, will maintain the room at a comfortably cool temperature.

There is preferably included in the control apparatus a relay operating under the control of a furnace thermostat for determining the speed of operation of the blower. The control apparatus may further include a humidostat adapted to operate preferably when the blower is operating at high speed to control the humidity of the air supplied to the blower and to the room through the furnace air duct according to the humidity requirements of the air already in the room. In the event it is desirable to utilize the heating system as a ventilating and cooling system during the summer months, a summer and winter control may be incorporated and the room thermostat employed to control the apparatus according to room temperature. The relay may be operated by the room thermostat when a predetermined high room temperature is reached to run the blower at high and low speed and to place a humidity control in operating condition not only to control the humidity of the air supplied to the room but also to cool the air by washing it if so desired.

Referring to Fig. 1, it will be understood that the furnace may be of any type other than that of the warm air type, and there may be used coal or other solid fuel, or liquid fuel, such as oil or gas, suitable arrangements being made in connection with the control apparatus to allow for such well known variations in the heating art.

Furnace 1 includes a fire box 2, a warm air duct 4, forming a bonnet for the furnace, and one or more warm air ducts 3 leading to the room or rooms to be heated. A blower 5 is illustrated as communicating with warm air duct 4 by a passage 6 and with the fire box 2 by a passage 7.

An electrically operated damper controller 8 is arranged to actuate a damper 9 adapted to swing to open and closed positions at or adjacent to the outlet of blower 5.

Damper 9 may be pivotally mounted to close passage 7 leading to fire box 2 of furnace 1 when swung to closed position and to open passage 7 when swung to its open position, as shown in dotted lines in Fig. 1. It will be understood that the exact location or movement of damper 9 to accomplish the results herein disclosed need not be limited as shown in the drawing, because it will be obvious to those skilled in the art that various other damper constructions may be provided without departing from the essence of the present invention.

Electrically operated controller 8 may include any suitable motor, but as shown, may be a vapor motor having a heating element 10 and a coil 11 arranged in a circuit including wires 12 and 13. It is not believed necessary to describe in detail the construction of the vapor motor because any suitable type of motor may be used. It is only essential to employ a prime mover capable of operating damper 9 to open passage 7 when it is desired to provide a forced draft to the fire box to increase the rate of combustion and to close this passage when the heat of the furnace rises above a predetermined temperature.

The motor circuit, including wires 12 and 13, may include a secondary coil 14 of a transformer 15 having its primary coil 16 connected across the line wires 17 and 18. The circuit of room thermostat 20 includes a wire 21 connecting to secondary coil 14 of transformer 15 and a wire 22 connecting to an intermediate contact 23 of a furnace thermostat 24. Furnace thermostat 24 may be, if so desired, of a type including a cold contact 25 and a hot contact 26. Cold contact may connect to motor circuit wire 12 by a wire 27. Hot contact 26 may include in its connections a control element, such as a relay 28 connected in the line by a wire 29 and to this hot contact 26 by a wire 30. Furnace thermostat may be known as a limit switch adapted to close the motor circuit of the electrically operated damper controller 8 when room thermostat 20 calls for heat and the furnace is at a predetermined low temperature. This limit switch may also act to energize relay 28 while room thermostat 20 is still calling for heat, although the heat of the furnace has been increased to a predetermined temperature.

As previously stated, it is desirable to operate blower 5 at low and high speeds, the low speed effecting a circulation of air which is just sufficient to keep the air in the room in circulation

to prevent air stratification, and, when the thermostat calls for heat and the furnace is cold, to supply a forced draft sufficient to increase the furnace temperature, and also to allow a portion of this circulation to continue to the room, the decreased air flowing to the room as the result of a portion being used as a forced draft, causing a sensible feeling of a rising temperature at a time when the room is cold and awaiting heat from the furnace. The low speed circuit includes a wire 34, armature 33, wire 32, blower 5 and return wire 35. The high speed circuit includes wire 34, armature 33, wire 36, blower 5 and return wire 35.

It is possible to include a humidifying control for controlling the humidity of the air taken in by the blower at its inlet in accordance with the humidity conditions of the air in the room. It is desirable, however, to operate the humidifying control preferably when the blower is operating at high speed and supplying its air discharge to the warm air conduit 4 of the furnace and to the room. This humidifying control may include a transformer 38 connected across the high speed circuit of blower 5. Transformer 38 includes a primary coil 39 and a secondary coil 40, primary coil 39 being connected by the wires 41 and 42 with the wires 36 and 35, respectively, of the high speed blower circuit. Secondary coil 40 may include a humidostat 43 and a humidifying device 44.

The three-wire circuit shown in Fig. 2 includes a summer and winter control also permitting the use of the heating system as an air ventilating and cooling system during the summer months.

It will be noted that a winter switch 45 is inserted in the wire 22 leading from room thermostat 20 to the middle contact 23 of furnace thermostat 24. In the summer months, switch 45 is opened, while a summer switch 46 in a wire 47 leading from a hot contact 48 of room thermostat 20 to wire 30 is closed. It will be observed, therefore, that a heating system embodying my invention may be converted in a simple fashion to a ventilating and cooling system in the summer months by the mere provision of a room thermostat having hot and cold contacts and a summer and winter switch including the connection 47 leading to wire 30 controlling relay 28. A hot room temperature will cause room thermostat 20 to close the circuit at hot contact 48 and energize relay 28 to close the high speed blower circuit. Blower 5 will operate at high speed to supply the required air to maintain a comfortable ventilation in the room.

On the other hand, the humidifying apparatus disclosed in Fig. 1 may be converted into a cooling apparatus as shown in Fig. 3 by providing the humidifying device 44 in the form of a sprayer or air washer 50 arranged in a suitable tank 51 having any suitable air inlet and a duct 53 leading from the intake of blower 5. If it is not desirable to wash the air as shown in Fig. 3, the humidifying device 44 may act to merely provide sufficient humidity to the air supplied to the intake of the blower according to the humidity conditions of the air in the room. It is desirable to include a snap switch 57 in the low speed circuit of the blower so as to permit cutting out of the low speed circuit of the blower during the summer months, however, it will be apparent that failure to open switch 57 during the summer months will permit the blower to operate continuously at low speed, thereby supplying a continuous circulation of the cooling medium to the room during the summer period, except when the temperature of the room rises to close the hot contact of the room thermostat and operate the blower at high speed to effect a more rapid cooling action.

Inasmuch as the control apparatus is entirely automatic and may operate, therefore, as aforesaid, throughout the year without requiring attention other than to operate the winter and summer switches 45 and 46, it may be desirable to provide a snap switch 56 in the line circuit above transformer 15 in order to disable the automatic operation at any time.

The operation of the control apparatus above described will now be given: Assume that the winter switch 45 is closed and the summer switch 46 is open and the temperature of the room has dropped sufficiently to close the cold side of room thermostat 20. If the furnace is cold, the motor circuit of the electrically operated damper controller 8 is closed at the furnace thermostat 24. The electrically operated damper controller 8 swings the damper 9 to open position. It will be understood, however, that during this period the blower 5 is operating at low speed, relay 28 has not been energized and armature 33 is in a position bridging the contact of wire 32 of the low speed blower circuit. After damper 9 is swung to open position, a portion of the blower discharge is fed through passage 7 to the fire box to act as a forced draft and to increase the rate of combustion. The remaining portion of the blower discharge passing to duct 4 and the room through duct 3 is less than is normally fed to the room at low speed of the blower, with the effect that there is a sensible feeling of a rising room temperature at a time when the room is cold and about to receive heat from the furnace.

When the heat of the furnace reaches a predetermined temperature, furnace thermostat 24 closes the circuit across its hot contact and operates the control element 28, such as the relay, to swing armature 33 from its contact with wire 32 to the contact of the high speed blower wire 36. Thereupon blower 5 will operate at high speed to increase the blower discharge, and consequently, the circulation of air to the room. When movable contact 23 of furnace thermostat 24 swings from cold contact 25 to hot contact 26, to energize relay 28, the motor circuit of damper controller 8 will open. The cooling effects of the air discharge of bolwer 5 will tend to accelerate the return movement of the electrically operated damper controller 8 if the prime mover of this controller is a heat motor with its heating unit 10 arranged in the path of the air flow from the blower, as shown in Fig. 1. The forced draft to the furnace is discontinued, therefore, when the blower operates at high speed. By increasing the blower discharge upon a predetermined rise of temperature, rapid and satisfactory heating of the room is assured without the danger of this increased air circulation being sent to the room cold. Also, increasing the air circulation when the furnace is hot prevents any tendency of the furnace to overheat.

If the room thermostat 20 is still calling for heat and the furnace temperature has been lowered by the increased circulation of air from blower 5, furnace thermostat 24 causes its movable contact 23 again to engage cold contact 25 and operate the damper controller 8 so as to swing damper 9 to open position. At the same time the circuit is broken, of course, at the hot contact 26 of the furnace thermostat 24, with the result that

armature 33 drops back to its low speed position connecting wires 32 and 34. Blower 5 immediately operates at low speed and supplies air, a portion of which is again utilized as a forced draft for the fire to increase its rate of combustion. When furnace temperature is again raised, the movable contact 23 will bridge hot contact 26 of furnace thermostat 24. The damper 9 is again closed and the blower is operated at high speed to increase the circulation of air at its discharge outlet. This increased circulation of air again enters the warm air conduit 4 to be heated and fed to the room or rooms through warm air duct or ducts 3. This cycle of operation is repeated until the room thermostat 20 is satisfied.

It will be noted that the humidifying apparatus operates to increase the humidity of the air supplied to the intake of blower 5, preferably when this blower is operating at high speed and supplying its discharge to the room.

If it is desirable to utilize the heating system herein disclosed as a ventilating and cooling system during the summer months, the winter switch 45 is opened and the summer switch 46 is closed. Control element or relay 28 is placed under the direct control of room thermostat 20, instead of furnace thermostat 24, and is actuated when room thermostat closes the circuit at hot contact 48 upon a predetermined rise of room temperature. Blower 5 will then operate at high speed to supply sufficient circulation of air to provide adequate ventilation to the room. If it is desirable to wash the air for the purpose of cooling it, the humidifying device 44 may be a sprayer 50, as shown in Fig. 3, arranged to wash the air entering tank 51 and the pipe 59 leading to the intake of blower 5. Switch 57 may be opened during the summer months to prevent the blower from operating at low speed when the room thermostat is not closed at its hot contact 48, and switch 58 may be opened at any time to cut out the operation of the humidity control circuit.

As before stated, furnace 1 may be of any suitable type and fired by coal, or other solid fuel, or liquid fuel, such as oil or gas. In Fig. 4, I have illustrated diagrammatically an electrically operated control 60', such as an oil valve or gas valve, connected in parallel across the wires 12 and 13 of the motor circuit of the damper controller 8, which will operate to supply fuel, in varying amounts as may be necessary to control the rate of combustion, when thermostat 20 calls for heat and damper controller 8 operates to allow a portion of the air circulation to enter the fire box as a forced draft. Control 60' is merely illustrative of one way in which the present apparatus may be adapted to different furnaces or heating systems.

It is not essential to control the rate of combustion where it is desirable to use the high and low speed blower to control circulation of hot air only from the furnace 1, or the heat-conducting medium, such as hot water, steam or the like, in case of furnaces other than the warm air type. Accordingly, in Fig. 5 there is illustrated the heating system omitting the apparatus and connections providing a forced draft through passage 7 to fire-box 2. The circuit of room thermostat 60 will include wire 61, contacts 62 and 63 of a furnace switch 64, coil 65 of a draft controller 66, wire 67, a secondary coil 68 of a transformer 69, a wire 73, a connection 74 through damper controller 66, and a wire 75.

Two relay circuits are preferably connected across the opposite sides of the circuit of the room thermostat 60. The first relay circuit includes a wire 76, the coil 77 of a relay 78, and a wire 79. The second relay circuit includes a wire 80, the contacts 81 and 82 of a furnace switch 83, the winding 84 of a relay 85, and a wire 86.

The high speed circuit of blower 5 may include a wire 87, blower 5, a wire 88, a contact 89, an armature 90 of relay 78, a wire 91, a contact 92, an armature 93 of relay 85, and a wire 94.

Draft controller 66 is so arranged that, when its actuating coil 65 is energized, it opens the draft and closes the check, and, when deenergized, it closes the draft and opens the check.

Furnace switch 64 is preferably disposed in the room thermostatic circuit between the damper controller 66 and the room thermostat 60. The movable contact 63 of this furnace switch 64 is adapted to disengage contact 62 and open the room thermostatic circuit when the temperature of the furnace rises above or exceeds a predetermined degree. Accordingly, furnace switch 64 prevents overheating of the furnace by opening the circuit to deenergize actuating coil 65 of the damper controller 66, although room thermostat 60 may continue to call for heat. However, if the temperature of the furnace does not exceed a predetermined degree, the circuit of the room thermostat will remain closed to accelerate combustion at the furnace as long as the room thermostat 60 calls for heat.

The relay circuit, including relay 78, is energized when the current flows through the circuit of the room thermostat. Relay 78 actuates armature 90 to close the high speed circuit of blower 5 at contact 89. However, current will not flow through the high speed circuit of blower 5 if the temperature of the furnace drops below a predetermined degree. This is accomplished by an auxiliary circuit embodying relay 85. The furnace switch 83 is arranged to open this auxiliary circuit in the event the temperature of the furnace falls below a predetermined degree, say, for example, below 100° Fahr. Consequently, it will be impossible for blower 5 to deliver air at a temperature not high enough to raise the temperature in the room. It is found that where the temperature of the furnace is too low, operation of the blower will deliver cold air into the room.

If the furnace is above this predetermined low point, contact 82 of furnace switch 83 will engage contact 81 to energize the relay 85, and cause this relay to attract armature 93 into circuit closing position against contact 92. Current will then flow from one side of the line, wire 94, armature 93, contact 92, wire 91, armature 90 of relay 78, contact 89, wire 88, blower 5, and through wire 87 to the other side of the line.

It will be observed that this arrangement of the apparatus will effect high speed operation of blower 5 whenever room thermostat 60 calls for heat and the furnace is below a predetermined high temperature, say, for example, 165° Fahr., but above a predetermined low temperature, say 100° Fahr. If the room thermostat 60 is satisfied and there is no demand for heat in the room, or if the furnace temperature is above said predetermined high degree of 165° Fahr., such as might cause overheating of the furnace, the actuating coil 65 of damper controller 6 will be deenergized and the combustion checked by the draft opening and the check closing. Moreover, if the room thermostat 60 opens, relay 78 will be

1699 Northern District of Illinois }
Eastern Division } ss:

I, Hoyt King, Clerk of the District Court of the United States for the Northern District of Illinois, do hereby certify the above and foregoing to be a true and complete transcript of the proceedings had of record made in accordance with Designation, Additional Designation and Amended Designation filed in this Court in the cause entitled The Mercoid Corporation vs. Minneapolis-Honeywell Regulator Company, Consolidated Cause No. 1839, as the same appear from the original records and files thereof now remaining in my custody and control.

In Testimony Whereof, I have hereunto set my hand and affixed the seal of said Court at my office, in the City of Chicago, in said District, this 22nd day of May, A. D. 1942.

Hoyt King,
Clerk.

(Seal)

UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

I, Kenneth J. Carrick, Clerk of the United States Circuit Court of Appeals for the Seventh Circuit, do hereby certify that the foregoing printed pages contain a true copy of Volume two of the printed record which together with Volume one, constitutes the record, in Causes Nos.:

8019 { The Mercoid Corporation,
Plaintiff-Appellee,
vs.
Minneapolis-Honeywell Regulator Company,
Defendant-Appellant.

8020 { The Mercoid Corporation,
Plaintiff-Appellant,
vs.
Minneapolis-Honeywell Regulator Company,
Defendant-Appellee,

as the same remains upon the files and records of the United States Circuit Court of Appeals for the Seventh Circuit.

In Testimony Whereof I hereunto subscribe my name and affix the seal of said United States Circuit Court of Appeals for the Seventh Circuit, at the City of Chicago, this 23rd day of April, A. D. 1943.

Kenneth J. Carrick,
(Seal) *Clerk of the United States Circuit Court of Appeals for the Seventh Circuit.*

At a regular term of the United States Circuit Court of Appeals for the Seventh Circuit held in the City of Chicago and begun on the sixth day of October, in the year of our Lord one thousand nine hundred and forty-two, and of our Independence the one hundred and sixty-seventh.

The Mercoid Corporation, *Plaintiff-Appellee,* vs. Minneapolis-Honeywell Regulator Company, *Defendant-Appellant.* 8019	Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division.
The Mercoid Corporation, *Plaintiff-Appellant,* vs. Minneapolis-Honeywell Regulator Company, *Defendant-Appellee.* 8020	

And, to-wit: On the twenty-third day of May, 1942, there was filed in the office of the Clerk of this Court, in cause No. 8019, an appearance of counsel for appellant, which said appearance is, in the words and figures following, to-wit:

IN THE UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

The Mercoid Corporation, *Plaintiff*, vs. Minneapolis-Honeywell Regulator Company, *Defendant.*	Appeal No. 8029.

ENTRY OF APPEARANCE.

Please enter our appearance as counsel for Minneapolis-Honeywell Regulator Company in the above-identified cause.

Bair & Freeman,
Room 1400 — 135 South LaSalle Street,
Chicago, Illinois.

Of Counsel:
W. P. Bair,
Will Freeman.
(Chicago, Illinois, May 23, 1942.)

Endorsed: Filed May 23, 1942. Kenneth J. Carrick, Clerk.

And on the same day, to wit: On the twenty-third day of May, 1942, there was filed in the office of the Clerk of this Court, in cause No. 8029, an appearance of counsel for appellant, which said appearance is in the words and figures following, to wit:

UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

Cause No. 8020.

The Mercoid Corporation,

vs.

Minneapolis-Honeywell Regulator Company.

The Clerk will enter our appearance as counsel for The Mercoid Corporation.

Langdon Moore,
Langdon Moore,
L. Kerans Moore,
L. Kerans Moore,
53 W. Jackson Boulevard,
Chicago.

Endorsed: Filed May 23, 1942. Kenneth J. Carrick, Clerk.

And afterwards, to wit: On the fifth day of November, 1942, the following further proceedings were had and entered of record, to-wit:

Thursday, November 5, 1942.

Court met pursuant to adjournment.

Before:

Hon. William M. Sparks, Circuit Judge.
Hon. J. Earl Major, Circuit Judge.
Hon. Sherman Minton, Circuit Judge.

The Mercoid Corporation, *Plaintiff-Appellee*, vs. Minneapolis-Honeywell Regulator Co., *Defendant-Appellant*.	Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division
8019	
The Mercoid Corporation, *Plaintiff-Appellant*, vs. Minneapolis-Honeywell Regulator Co., *Defendant-Appellee*.	
8020	

Now this day come the parties by their counsel, and this cause comes on to be heard on the transcript of the record and briefs of counsel, and on oral argument by Mr. Ludington Moore, counsel for The Mercoid Corporation, and by Mr. Will Freeman and Mr. W. P. Bair, counsel for Minneapolis Honeywell Regulator Co., and the Court takes this matter under advisement.

And afterwards, to-wit: On the twenty-third day of December, 1942, there was filed in the office of the Clerk of this Court, the Opinion of the Court, which said Opinion is in the words and figures following, to wit:

IN THE UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

October Term and Session, 1942.

No. 8019.
THE MERCOID CORPORATION,
Plaintiff-Appellee,
vs.
MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Defendant-Appellant.

No. 8020.
THE MERCOID CORPORATION,
Plaintiff-Appellant,
vs.
MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Defendant-Appellee.

Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division.

December 23, 1942.

Before SPARKS, MAJOR and MINTON, *Circuit Judges.*

SPARKS, *Circuit Judge.* In cause No. 8019, the Mercoid Corporation (hereafter referred to as Mercoid) asked for a declaratory judgment holding United States Patent No. 1,813,732 to Freeman, owned by Minneapolis-Honeywell Regulator Company (hereafter referred to as Honeywell) void and not infringed, and that that patent was being used to extend the patent monopoly beyond the bounds of its claims in violation of the Anti-Trust laws. In cause No. 8020, Honeywell, before it was notified of Mercoid's suit, charged Mercoid with infringement of claims 1, 4, 6 and 9 of the Freeman patent, by its sale of Mercoid's Combina-

tion Fan Limit Control with wiring diagrams showing how to install it. The patent was issued on July 7, 1931, upon an application filed January 16, 1931, and assigned to Honeywell.

Honeywell, answering Mercoid's complaint, averred validity and infringement by Mercoid, and denied any alleged improper use of its patent. Mercoid, in answering Honeywell's complaint, denied validity and infringement, alleged the same improper use of the patent, and counterclaimed for damages for violation of the Anti-Trust laws.

The cases were consolidated for trial before the District Court, which held the patent valid and infringed, and that Honeywell was not guilty of laches, but further held that Honeywell could not maintain a suit for infringement because it had used the patent to control the sales of articles beyond its scope. The court disallowed damages against Honeywell for violation of the Anti-Trust laws and dismissed both complaints. From this decree both parties have appealed.

Freeman's combination relates to control apparatus for use with a hot air furnace. Its principal object is to provide a control for the rate of combustion and for the operation of an accelerating device, such as a fan, blower or similar apparatus, used for accelerating the rate of supply of the heat-conducting medium, such as air, to be heated by a furnace, said control being such as to permit the operation of the accelerating device and to check combustion in case the furnace becomes overheated, and such as to interrupt the operation of such accelerating device while increasing the rate of combustion if the furnace has not been heated above a predetermined temperature. In addition, a control feature is added by means of which both the combustion and the supply of the heat-conducting medium are checked when the temperature of the room or object to be heated is above a predetermined degree.

Mercoid's device, which was held to infringe the patent, is referred to by the parties as M-80. The District Court wrote an opinion in these cases (*Mercoid Corporation* v. *Minneapolis-Honeywell Regulator Co.*, 43 Fed. Supp. 878) in which it set forth the patent claims in issue and discussed the issues including prior art, prior uses and laches,

and they will not be repeated here. It is sufficient to say that the finding could not well have been otherwise under the evidence presented, and we approve that court's reasoning and conclusions with respect to validity, infringement and laches. This brings us to what we regard as the vital questions in this case,—whether Honeywell has so misused the Freeman system of furnace control as to bar its suit for infringement, and whether its misuse, if any, constitutes a violation of the Anti-Trust laws. Both the answer in bar and the charge of violation of the Anti-Trust laws are based upon the same allegations of misuser.

The District Court based its decision as to Honeywell's misuse upon the rule referred to in *Morton Salt Co. v. Suppiger Co.*, 314 U. S. 488. That rule, which is equitable in its nature and of general application, asserts that courts, and especially courts of equity, may appropriately withhold their aid where the plaintiff is using the right asserted contrary to the public interest. The Morton case involved a patented mechanism for depositing salt tablets, a device said to be useful in the canning industry for adding predetermined amounts of salt in tablet form to the contents of the cans. The patent was on the mechanism, not on the salt nor on its configuration. Salt is an article of commerce, quite generally used from time immemorial. It is unpatented and is not an element of the patent upon which Morton relied. However, Morton sought to compel the purchasers of its patented mechanism to use only the salt purchased from it, which was in no sense a part of the patent. The Supreme Court held that Morton could not do this because to do so would constitute a contributing factor in thwarting the public policy underlying the grant of the patent. The Court stated quite generally that a patent could not be used as a means of restraining competition with the patentee's sale of an unpatended *product*. It is to be noted that the Court carefully refrained from using the word *element* instead of the word *product*, because in that case salt was not an element of that patent, nor did that patent cover a product. The salt tablets in no sense could be considered as the "advance in the art" in the patent there in suit.

The patent here covers a furnace control system having a combustion control apparatus, a fan to force hot air from

the furnace to the rooms, a thermostatic apparatus for controlling the combustion control apparatus and fan. It discloses a hand-fired furnace with dampers and also a furnace with a stoker.

With respect to the stoker-operated furnace, a room thermostat normally starts the stoker. There is also a thermostat which breaks the stoker circuit when the air in the furnace reaches a predetermined high temperature, even though the room thermostat is calling for heat. This is for the purpose of preventing unsafe overheated conditions. Another thermostat is also placed in the furnace which does not permit the fan to start until the air in the furnace reaches a certain heat. It then starts the fan which continues to run so long as the furnace is hot and the room thermostat calls for heat, even if the stoker is stopped by the limit switch.

Honeywell urges that Freeman's advance in the art is the arrangement of thermostat switches, subject to furnace heat, in connection with other parts, to secure a sequence of operations whereby combustion is stopped before excessive heat is reached in the furnace, but the fan continues to run and take the heated air from the furnace and deliver it to the rooms. The claims, it will be noticed, include the necessary combustion control and fan, and, in some cases, the room thermostat, together with the thermostatic fan and limit switch connected to secure sequence of operations.

Mercoid's M-80 is a combination fan and limit control. It has two thermostatically operated switches in a single casing so arranged as to permit the fan to operate when the limit switch has opened the circuit of the stoker motor for stopping combustion when a dangerous and excessive temperature has arisen in the furnace. It provides for the sequence of operations which is the precise essence of Freeman's advance in the art. With each M-80, Mercoid provides certain wiring diagrams for installation. The accused device has no other use than for accomplishing the sequence of operations of the Freeman patent. Mercoid's expert testified that when installed according to Mercoid's diagram it infringed the Freeman patent. The District Court was warranted in relying on this evidence and we are convinced that it is true.

Honeywell has granted licenses to others and offered a license to Mercoid on the same terms and conditions, which was refused. Mercoid contends that these licenses involve use of the patent to monopolize the sale and control of devices not covered by the patent and this, it urges, bars Honeywell's right to maintain an infringement suit and also violates the Anti-Trust laws. These licenses call for payment of a royalty on the defined combination furnace control which embodies the essence of Freeman's patent. Each of such controls brings about one complete Freeman installation, and the record does not disclose any attempt on the part of Honeywell to collect a royalty on such control unless it is used or attempted to be used in a system which would infringe the Freeman combination. In this we think there is no attempt to illegally monopolize the sale of the Honeywell control unless it is used or intended to be used in the Honeywell system.

All licenses issued by Honeywell are the same in so far as the issues before us are concerned. Section 1 of the license here involved is as follows: "As used in this agreement, the expression 'Combination Furnace Control' shall mean a unitary structure including at least a switching means for controlling not less than two circuits and operated by temperature responsive means responsive to the temperature of a heating device or the fluid medium heated thereby, one of said circuits being established on temperature rise and another being established on temperature fall, the structure having permanent internal wiring connecting the switching means to terminals for the connection of external wires thereto, the internal wiring being so arranged that when the terminals are connected by external wires to a heat controlling mechanism or a combustion controlling mechanism for the heating device and to a means for controlling the circulation of the fluid medium heated thereby, such structure, when used as intended, embodies the system disclosed in and claimed by the Freeman patent * * *. It being understood that this definition is not intended so far as said Freeman Patent is involved to limit the combinations in or with which said 'Combinaton Furnace Control' may be used by Licensee or its vendees."

Mercoid contends that these licenses involve use of the

patent to monopolize the sale of the control which of itself is not covered by the patent, and this it urges bars Honeywell's right to maintain an infringement suit, and also violates the Anti-Trust laws. In other words, it argues that Honeywell is guilty of inequitable conduct and of violating the Anti-Trust laws because it does not sell Freeman's systems, but sells unpatented controls which are not within the scope of the Freeman patent. This record discloses that the only Honeywell control which gets protection as a result of the licenses is the control usable only for a Freeman type installation, which of course embodies the Freeman "advance in the art." It further discloses that Honeywell never accused anyone under the Freeman patent on account of the sale of standard controls, which might be used with the Freeman installation, or might be used with some other installation. So far as we have been able to discover from this record, all the conduct of Honeywell which is here complained of has been solely directed toward the protection of the Freeman patent. The patent laws permit such conduct and the Anti-Trust laws do not forbid it. *Bement* v. *National Co.*, 186 U. S. 70; *United States* v. *United Shoe Machinery Co.*, 247 U. S. 32; *United Shoe Machinery Co.* v. *U. S.*, 258 U. S. 451.

It has long been held that the owner of a patent may restrain contributory infringement, if within his rights under the patent law, providing his conduct is otherwise proper. *Wallace* v. *Holmes*, 29 Fed. Cases, No. 17,100, 9 Blatchf. 65. It has been held further that one is an infringer if he makes and sells an unpatented element of a combination which serves to distinguish the invention, that is to say, to make the advance upon the prior art, knowing that it is to go into the patented combination. *Leeds & Catlin* v. *Victor Co.*, 213 U. S. 325.

In support of its contention to the contrary, Mercoid relies upon *Carbice Corp.* v. *American Patents Corp.*, 283 U. S. 27, and *Leitch* v. *Barber*, 302 U. S. 458, and kindred cases. In the Carbice case, the Supreme Court said that it was wholly unlike the Leeds & Catlin case, and in the Leitch case, the Court said that there was nothing in the Leeds & Catlin case that limited the rule in the Carbice case. Other cases upon which Mercoid relies are *Motion Picture Patents Co.* v. *Universal Film Co.*, 243 U. S. 502;

Morton Salt Co. v. *Suppiger Co., supra; B. B. Chemical Co.* v. *Ellis*, 314 U. S. 495; *American Lecithin Co.* v. *Warfield Co.*, 105 F. 2d 207; and *Philad Co.* v. *Lechler Laboratories*, 107 F. 2d 747. In all these cases the objectionable conduct was directed toward the sale of something which was not the advance in the art and did not necessarily measure or mark the use covered by the patent.

We find no evidence in this case that Honeywell by its conduct or by its license required anyone to buy any element or elements of the patent from Honeywell or its licensees, but all of its conduct complained of was directed to the protection of Freeman's advance in the art. This we think was well within its rights and we find no decision to the contrary. Since it has not exceeded any of its rights under the patent, on the same facts it cannot be said that it has violated the Anti-Trust laws.

The decree of the District Court is affirmed in all respects, except as to its decree that Honeywell has been so using its Freeman patent as to tend to create a monopoly in an unpatented device, and in dismissing Honeywell's complaint, and in the assessment of costs. In these respects the decree is reversed and the cause is remanded to the District Court for further proceedings not inconsistent with this opinion.

Endorsed: Filed December 23, 1942. Kenneth J. Carrick, Clerk.

And on the same day, to-wit: On the twenty-third day of December, 1942, the following further proceedings were had and entered of record, to-wit:

Wednesday, December 23, 1942.

Court met pursuant to adjournment.

Before:

Hon. William M. Sparks, Circuit Judge.
Hon. J. Earl Major, Circuit Judge.
Hon. Sherman Minton, Circuit Judge.

	The Mercoid Corporation, *Plaintiff-Appellee*,	Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division.
8019	*vs.*	
	Minneapolis-Honeywell Regulator Co., *Defendant-Appellant.*	

This cause came on to be heard on the transcript of the record from the District Court of the United States for the Northern District of Illinois, Eastern Division, and was argued by counsel.

On Consideration Whereof: It is ordered, adjudged and decreed by this Court that the decree of the said District Court in this cause appealed from be, and the same is hereby, affirmed, with costs, except as to its decree that Honeywell has been so using its Freeman patent as to tend to create a monopoly in an unpatented device, and in dismissing Honeywell's complaint and in the assessment of costs, and in these respects the decree is reversed, and this cause be, and the same is hereby, remanded to the said District Court for further proceedings not inconsistent with the Opinion of this Court filed this day.

	The Mercoid Corporation, *Plaintiff-Appellant*,	Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division.
8020	*vs.*	
	Minneapolis-Honeywell Regulator Co., *Defendant-Appellee.*	

This cause came on to be heard on the transcript of the record from the District Court of the United States for the

Northern District of Illinois, Eastern Division, and was argued by counsel.

On Consideration Whereof: It is ordered, adjudged and decreed by this Court that the decree of the said District Court in this cause appealed from be, and the same is hereby, affirmed, with costs, except as to its decree that Honeywell has been using its Freeman patent as to tend to create a monopoly in an unpatented device, and in dismissing Honeywell's complaint and in the assessment of costs, and in these respects the decree is reversed, and this cause be, and the same is hereby remanded to the said District Court for further proceedings not inconsistent with the Opinion of this Court filed this day.

And afterwards, to-wit: On the twenty-ninth day of December, 1942, there was filed in the office of the Clerk of this Court, a Stipulation extending time to file Rehearing, which said Stipulation is in the words and figures following, to-wit:

IN THE UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

The Mercoid Corporation, *Plaintiff-Appellee,* *vs.* Minneapolis-Honeywell Regulator Company, *Defendant-Appellant.*	Appeal No. 8019.

The Mercoid Corporation, *Plaintiff-Appellant,* *vs.* Minneapolis-Honeywell Regulator Company, *Defendant-Appellee.*	Appeal No. 8020.

STIPULATION.

It is hereby stipulated by and between the parties to the above entitled causes that the time within which The Mer-

Mercoid Corporation may file a petition for rehearing be extended to and include January 17, 1943.

Bair & Freeman,
Attorneys for Minneapolis-Honeywell Regulator Company,
135 South La Salle Street,
December 28, 1942. Chicago, Illinois.

Langdon Moore,
Attorney for The Mercoid Corporation,
53 West Jackson Boulevard,
December 28, 1942. Chicago, Illinois.

Endorsed: Filed December 29, 1942. Kenneth J. Carrick, Clerk.

And on the same day, to-wit: On the twenty-ninth day of December, 1942, the following further proceedings were had and entered of record, to wit:

Tuesday, December 29, 1942.

Court met pursuant to adjournment.

Before:

Hon. William M. Sparks, Circuit Judge.

The Mercoid Corporation, *Plaintiff-Appellee,* vs. Minneapolis-Honeywell Regulator Co., *Defendant-Appellant.* 8019	Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division.
The Mercoid Corporation, *Plaintiff-Appellant,* vs. Minneapolis-Honeywell Regulator Co., *Defendant-Appellee.* 8020	

Pursuant to stipulation of counsel, it is ordered that the time for The Mercoid Corporation to file a petition for rehearing of this cause be, and the same is hereby, extended to and including January 17, 1943.

And afterwards, to-wit: On the twelfth day of January, 1943, there was filed in the office of the Clerk of this Court, a Stipulation extending time to file rehearing, which said Stipulation is in the words and figures following, to-wit:

IN THE UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

The Mercoid Corporation,
Plaintiff-Appellee,
vs.
Minneapolis-Honeywell Regulator Company,
Defendant-Appellant.
} Appeal No. 8019.

The Mercoid Corporation,
Plaintiff-Appellant,
vs.
Minneapolis-Honeywell Regulator Company,
Defendant-Appellee.
} Appeal No. 8020.

STIPULATION.

It is hereby stipulated by and between the parties to the above entitled causes that the time within which The Mercoid Corporation may file a petition for rehearing be extended to and include January 23, 1943.

Bair & Freeman,
Attorneys for Minneapolis-Honeywell Regulator Company.
135 South LaSalle Street,
January 11, 1943. Chicago, Illinois.

Langdon Moore,
Attorney for The Mercoid Corporation,
53 West Jackson Boulevard,
January 11, 1943. Chicago, Illinois.

Endorsed: Filed January 12, 1943. Kenneth J. Carrick, Clerk.

And afterwards, to-wit: On the twelfth day of January, 1943, the following further proceedings were had and entered of record, to-wit:

Tuesday, January 12, 1943.

Court met pursaant to adjournment.

Before:

Hon. William M. Sparks, Circuit Judge.

The Mercoid Corporation,
Plaintiff-Appellee,
8019 *vs.*
Minneapolis-Honeywell Regulator Co.,
Defendant-Appellant.

The Mercoid Corporation,
Plaintiff-Appellant,
8020 *vs.*
Minneapolis-Honeywell Regulator Co.,
Defendant-Appellee.

Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division.

Pursuant to stipulation of counsel, it is ordered that the time for The Mercoid Corporation to file a petition for rehearing of this cause be, and the same is hereby, extended to and including January 23, 1943.

And afterwards, to-wit: On the twenty-third day of January, 1943, there was filed in the office of the Clerk of this Court, a Petition for a Rehearing, which said Petition for a Rehearing is not copied here.

And afterwards, to-wit: On the first day of February, 1943, there was filed in the office of the Clerk of this Court, an Answer to Petition for Rehearing, which said Answer is not copied here.

And afterwards, to-wit: On the twenty-seventh day of March, 1943, the following further proceedings were had and entered of record, to-wit:

Saturday, March 27, 1943.

Court met pursuant to adjournment.

Before:

Hon. William M. Sparks, Circuit Judge.
Hon. J. Earl Major, Circuit Judge.
Hon. Sherman Minton, Circuit Judge.

The Mercoid Corporation, *Plaintiff-Appellee,* vs. Minneapolis-Honeywell Regulator Co., *Defendant-Appellant.* 8019	Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division.
The Mercoid Corporation, *Plaintiff-Appellant,* vs. Minneapolis-Honeywell Regulator Co., *Defendant-Appellee.* 8020	

It is ordered by the Court that the petition for a hearing of this cause be, and it is hereby, denied.

And afterwards, to-wit: On the thirty-first day of March, 1943, there was filed in the office of the Clerk of this Court, Notice and Motion to Stay Mandate, which said Notice and Motion is in the words and figures following, to-wit:

IN THE UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

The Mercoid Corporation, *Plaintiff-Appellee,* *vs.* Minneapolis-Honeywell Regulator Company, *Defendant-Appellant.*	Cause No. 8019.

The Mercoid Corporation, *Plaintiff-Appellant,* *vs.* Minneapolis-Honeywell Regulator Company, *Defendant-Appellee.*	Cause No. 8020.

NOTICE.

To: Bair & Freeman,
135 South LaSalle Street,
Chicago, Illinois.

Please Take Notice that I am this day filing with the Clerk of the Circuit Court of Appeals for the Seventh Circuit the attached Motion.

Langdon Moore,
L. Kerans Moore,
Attorneys for The Mercoid Corporation,
53 West Jackson Boulevard,
Chicago, Illinois.

Copy of the above Notice with Motion attached hereto received this 30th day of March, 1943.

(s) Bair & Freeman,
Attorneys for Minneapolis-Honeywell Regulator Company.

IN THE UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

The Mercoid Corporation, *Plaintiff-Appellee,* *vs.* Minneapolis-Honeywell Regulator Company, *Defendant-Appellant.*	Cause No. 8019.
The Mercoid Corporation, *Plaintiff-Appellant* *vs.* Minneapolis-Honeywell Regulator Company, *Defendant-Appellee.*	Cause No. 8020.

MOTION.

Now comes The Mercoid Corporation, plaintiff-appellee in Cause No. 8019 and plaintiff-appellant in Cause No. 8020, and moves this Honorable Court to stay the mandate in the above entitled causes for 30 days in order for The Mercoid Corporation to apply to the Supreme Court of the United States for a writ of certiorari to review the decision of this Court, petition for rehearing denied March 27, 1943.

The Mercoid Corporation.
By Langdon Moore,
L. Kerans Moore,
Its Attorneys.

Endorsed: Filed March 31, 1943. Kenneth J. Carrick, Clerk.

And afterwards, to-wit: On the first day of April, 1943, the following further proceedings were had and entered of record, to-wit:

Wednesday, April 1, 1943.

Court met pursuant to adjournment.

Before:

Hon. William M. Sparks, Circuit Judge.

The Mercoid Corporation,
Plaintiff-Appellee,
8019 *vs.*
Minneapolis-Honeywell Regulator Co.,
Defendant-Appellant.

The Mercoid Corporation,
Plaintiff-Appellant,
8020 *vs.*
Minneapolis-Honeywell Regulator Co.,
Defendant-Appellee.

Appeals from the District Court of the United States for the Northern District of Illinois, Eastern Division.

On motion of counsel for The Mercoid Corporation, it is ordered that the issuance of the mandate in this cause be, and it is hereby, stayed pursuant to Rule 25 of the Rules of this Court.

UNITED STATES CIRCUIT COURT OF APPEALS

For the Seventh Circuit.

I, Kenneth J. Carrick, Clerk of the United States Circuit Court of Appeals for the Seventh Circuit, do hereby certify that the foregoing printed pages contain a true copy of the proceedings had and papers filed, excepting briefs of counsel, petition for rehearing and answer thereto, and stipulations and orders pertaining to briefs, in

The Mercoid Corporation,
Plaintiff-Appellee,

8019 *vs.*

Minneapolis-Honeywell Regulator Company,
Defendant-Appellant,

The Mercoid Corporation,
Plaintiff-Appellant,

8020 *vs.*

Minneapolis-Honeywell Regulator Company,
Defendant-Appellee,

as the same remains upon the files and records of the United States Circuit Court of Appeals for the Seventh Circuit.

In Testimony Whereof I hereunto subscribe my name and affix the seal of said United States Circuit Court of Appeals for the Seventh Circuit, at the City of Chicago, this 23rd day of April, A. D. 1943.

Kenneth J. Carrick,
(Seal) *Clerk of the United States Circuit Court of Appeals for the Seventh Circuit.*

SUPREME COURT OF THE UNITED STATES, OCTOBER TERM, 1943

No. 58

ORDER ALLOWING CERTIORARI—Filed June 7, 1943

The petition herein for a writ of certiorari to the United States Circuit Court of Appeals for the Seventh Circuit is granted, and the case is assigned for argument immediately following Nos. 973 and 974.

And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

SUPREME COURT OF THE UNITED STATES, OCTOBER TERM, 1943

No. 59

ORDER ALLOWING CERTIORARI—Filed June 7, 1943

The petition herein for a writ of certiorari to the United States Circuit Court of Appeals for the Seventh Circuit is granted, and the case is assigned for argument immediately following Nos. 973, 974, and 994.

And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

Supreme Court of The United States

No.

PETITION FOR WRIT OF CERTIORARI

and

BRIEF IN SUPPORT THEREOF

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IN THE

Supreme Court of The United States

OCTOBER TERM, A. D. 1942.

No. .....

THE MERCOID CORPORATION,

Petitioner,

vs.

MINNEAPOLIS HONEYWELL REGULATOR COMPANY,

Respondent.

PETITION FOR WRIT OF CERTIORARI.

To the Honorable, the Chief Justice and Associate Justices of the Supreme Court of the United States:

Your petitioner, The Mercoid Corporation, prays that a writ of certiorari issue to review the judgment of the United States Circuit Court of Appeals for the Seventh Circuit entered December 23, 1942 (R. 1225), reported in 133 Fed. (2d) 811 (Petition for rehearing denied March 27, 1943).

A certified transcript of the record in this case, including the proceedings in said Circuit Court of Appeals, is furnished herewith, in accordance with Rule 38 of the Rules of this Court.

Summary Statement of Matters Involved.

This is a suit brought by petitioner, The Mercoid Corporation, for a declaratory decree that the Freeman patent No. 1,813,732, issued July 7, 1931, for a furnace control owned by respondent, Minneapolis Honeywell, is invalid; that petitioner's fan and limit controls do not infringe nor contribute to the infringement of said patent; that respondent is not entitled to extend its patent monopoly to include petitioner's fan and limit controls not covered by said patent (R. 2). The complaint was filed June 29, 1940. Before answering petitioner's complaint, respondent filed a bill of complaint July 1, 1940, charging petitioner with infringement and contributing to the infringement of said Freeman patent (R. 38). Respondent filed its answer July 19, 1940 (R. 8). On September 20, 1940, petitioner filed its answer to respondent's bill of complaint averring that the claims of said patent are invalid; that respondent is utilizing the Freeman patent to establish a monopoly in the sale of combination furnace controls *per se* not coming within the boundaries of the Freeman patent (R. 48) and counterclaimed for a declaratory judgment. Respondent filed its reply to petitioner's counterclaim October 14, 1940 (R. 62). On January 7, 1941, petitioner filed a supplemental complaint for a declaratory judgment that respondent has granted licenses to five control manufacturers to make, use and sell combination furnace controls not covered by the patent to set up a monopoly beyond the scope of the patent; that respondent has deliberately conspired with its licensees and said licensees with respondent have wilfully and unlawfully conspired among themselves substantially to lessen competition and establish a monopoly in the sale of furnace controls in restraint of trade and have

established a price for the sale of individual controls not covered by the patent in violation of the Anti-Trust laws (R. 24). Respondent answered petitioner's supplemental complaint on January 28, 1941 (R. 31). Whereupon, these two suits were consolidated and tried together (R. 67). The District Court rendered an opinion February 27, 1942 (R. 1059), entered findings of fact and conclusions of law March 24, 1942 (R. 1065), and a final decree was entered March 24, 1942, that the said Freeman patent was valid; that petitioner contributes to the infringement of said patent; that respondent has been so using its Freeman patent as to tend to create a monopoly in an unpatented device; each of the complaints be hereby dismissed for want of equity; each of the parties pay one-half of the taxable costs (R. 1070).

An appeal and cross-appeal were duly taken by respondent and petitioner to the United States Circuit Court of Appeals for the Seventh Circuit and on December 23, 1942, said Court of Appeals affirmed the decree of the District Court in all respects, except as to its decree that respondent Honeywell has been so using its Freeman patent as to tend to create a monopoly in an unpatented device and in dismissing Honeywell's complaint, and in the assessment of costs. In these respects the decree was reversed and the cause remanded to the District Court for further proceedings not inconsistent with the opinion.

Jurisdiction.

1. This is a suit arising under the Patent Laws of the United States, Judicial Code, Sec. 24 (7), (28 U. S. C. Sec. 41 (7)), and under the Declaratory Judgment Act, Judicial Code, Sec. 274 d, amended, Title 28, Judicial Code, Sec. 400.

2. The jurisdiction of this Court is invoked under Section 240(a) of the Judicial Code, as amended by the Act of February 13, 1925 (28 U. S. C., Sec. 347), and under the Anti-Trust Laws, Title 15, U. S. Code, Sec. 4.

Questions Presented.

The decision of the Circuit Court of Appeals for the Seventh Circuit presents the following questions:

1. Is a patent valid as covering invention as distinguished from mechanical skill when the combined elements thereof are all separately old in the prior art and have been combined by the patentee to merely perform their old individual functions in a particular sequence?

2. Is a defendant a contributory infringer of a patent when it supplies an unpatented part designed for use, and knowing that it is to be used, in practicing the patented invention, but not a contributory infringer when the unpatented part so supplied is a mere article of commerce?

3. Does a patentee so use its patent as to be deprived of legal relief when the licenses it grants are conditioned upon the licensees purchasing from it an unpatented part for use in practicing the patented invention?

4. Does a patentee operate in restraint of trade and in violation of the Anti-Trust Laws when it requires as a condition to the use of a patented invention that an unpatented part thereof be purchased from the patentee or its licensee and fixes the price thereof?

Reasons for Granting the Writ.

The discretionary powers of this Court to grant a writ of certiorari are invoked under and suggested by Rule 38 of this Court:

1. *Conflict with decisions of other Circuit Courts of Appeal.*

(a) The Circuit Court of Appeals for the Seventh Circuit in this case has held that the combination of elements each old in the art and each performing the function for which it was designed is a valid patentable combination while the Circuit Court of Appeals for the First Circuit in *The Anderson Company et al. v. Lion Products, Inc., et al.*, 127 F. (2d) 454, and the Circuit Court of Appeals for the Third Circuit in *Zephyr American Corporation v. The Bates Manufacturing Company et al.*, 128 F. (2d) 380, have held that such a combination is not invention.

(b) The Circuit Court of Appeals for the Seventh Circuit in this case has held that one is a contributory infringer of a patent who furnishes an unpatented part especially designed for, and knowing it is to be used in, practicing the patented invention, while the Circuit Court of Appeals for the First Circuit, in *B. B. Chemical Co. v. Ellis*, 117 F. (2d) 829, and the Circuit Court of Appeals for the Second Circuit in *The Philad Co. v. Lechler Laboratories*, 107 F. (2d) 747, have held that there is no contributory infringement when the supplied part is unpatented, whether or not it be an old commodity or especially designed for use in practicing the patented invention.

(c) The Circuit Court of Appeals for the Seventh Circuit has held that a patentee is entitled to relief when it requires as a condition to the use of the patented invention

that an unpatented part used in practicing the invention must be purchased from it or from control manufacturers licensed to sell the said unpatented part at not less than fixed prices, while the Circuit Court of Appeals for the First Circuit in *B. B. Chemical Co. v. Ellis*, 117 F. (2d) 829, the Circuit Court of Appeals for the Second Circuit in *The Philad Company v. Lechler Laboratories*, 107 F. (2d) 747, the Circuit Court of Appeals for the Third Circuit in *Barber Asphalt Co. v. La Fera Grecco Contracting Co.*, 116 F. (2d) 211, the Circuit Court of Appeals for the Fourth Circuit in *Sulcania Ind. Corp. v. Viskina*, 132 F. (2d) 947, and the Circuit Court of Appeals for the Seventh Circuit in *American Lecithin v. Warfield*, 105 F. (2d) 207, have held to the contrary.

(d) The Circuit Court of Appeals for the Seventh Circuit has held that there is no restraint of trade in violation of the Anti Trust Laws when the owner of a patent forbids the purchase from competitors of an unpatented part necessary for the practice of the patented invention, while the Circuit Court of Appeals for the Third Circuit in *RCA v. Lord*, 28 F. (2d) 257, has held to the contrary.

2. *The Court of Appeals has decided a Federal question in a way probably in conflict with applicable decisions of this Court.*

(a) The Court of Appeals in holding the patent in suit valid is in conflict with this Court's decisions in *Keystone Driller Co. v. Northwest Engineering Corp.*, 294 U. S. 42; *Altoona Publix Theatres, Inc. v. American Tri-Ergon Corp.*, 294 U. S. 477; *Mantle Lamp Company of America v. Aluminum Products Co.*, 301 U. S. 544, and *Cuno Engineering Corporation v. The Automatic Devices Corporation*, 314 U. S. 84.

(b) The Circuit Court of Appeals has held that one is a contributory infringer of a patent who furnishes an unpatented part especially designed for and knowing it is to be used in practicing the patented invention, in conflict with this Court's decision in *Carbice Corp. v. Amer-*

ran Patents Development Corp., 283 U. S. 27; *Leitch Mfg. Co. v. Barber*, 302 U. S. 458; *Bassick Manufacturing Company v. Hollingshead Company*, 298 U. S. 415, and *Lincoln Engineering Co. v. Stewart Warner Corporation*, 303 U. S. 545.

(c) The Circuit Court of Appeals in holding that a patentee is entitled to relief when it requires as a condition to the use of the patented invention that an unpatented part used in practicing the invention must be purchased from it, is in conflict with this Court's decisions in *Carbice Corp. v. American Patents*, 283 U. S. 27; *Leitch Mfg. Co. v. Barber Co.*, 302 U. S. 458; *B. B. Chemical Co. v. Ellis*, 314 U. S. 495, and *Morton Salt Co. v. G. S. Suppiger Co.*, 314 U. S. 488.

3. *The Circuit Court of Appeals in the instant case has decided an important question of Federal law which has not been, but should be, settled by this Court.*

It held that there is no restraint of trade in violation of the Anti-Trust Laws when the owner of a patent forbids the purchase from competitors of an unpatented part necessary for the practice of the patented invention. The Circuit Court of Appeals for the Third Circuit in *RCA v. Last*, 28 F. (2d) 257, decided to the contrary, and this Court in *Morton Salt Co. v. Suppiger*, 314 U. S. 488, has suggested but not decided this question.

Wherefore, it is respectfully submitted that this petition for writ of certiorari to the Circuit Court of Appeals for the Seventh Circuit should be granted.

Lansden Moore,

George L. Wilkinson,

Counsel for Petitioner.

BRIEF IN SUPPORT OF PETITION FOR WRIT OF CERTIORARI.

Opinions of the Courts Below.

The memorandum opinion of the District Court for the Northern District of Illinois, Eastern Division, was filed February 27, 1942 (R. 1059); the findings of fact and conclusions of law were filed March 24, 1942 (R. 1065), and the decree entered pursuant thereto on March 24, 1942 (R. 1070).

The opinion of the Circuit Court of Appeals for the Seventh Circuit was filed December 23, 1942. It is reported in 133 F. (2d) 811.

Specification of Errors.

The errors which petitioner will urge if the writ of certiorari is issued are that the Circuit Court of Appeals for the Seventh Circuit erred:

1. In holding that the Freeman heating system patent in suit is a valid patent.

2. In construing the decisions of this Court in *Automatic Radio Company* v. *Northwest Engineering Corporation*, 294 U. S. 42; *Altoona Public Theatres, Inc.* v. *American Tri-Ergon Corp.*, 294 U. S. 477; *Mantle Lamp Company of America* v. *Aluminum Products Co.*, 304 U. S. 544, and *Cuno Engineering Corporation* v. *The Automatic Devices Corporation*, 314 U. S. 84, differently from the construction which has been placed upon these decisions by the First and Third Circuit Courts of Appeal.

3. In holding the sale of an appliance not covered by the system patent for use in performing the system contributes to the infringement of the patent.

4. In construing the decisions of this Court in *Carbice Corporation* v. *American Patents Development Corp.*

poration, 283 U. S. 27; *Leitch Mfg. Company* v. *Barber Company*, 302 U. S. 458; *Morton Salt Company* v. *Suppiger*, 314 U. S. 488, and *B. B. Chemical Co.* v. *Ellis et al.*, 314 U. S. 495, differently from the construction which has been placed upon these decisions by the First and Second Circuit Courts of Appeal.

5. In holding that the owner of a system patent who does not make, use, sell or install heating systems, but who makes and sells appliances for use in heating systems and requires the purchase from it of one of the appliances not covered by the patent as a condition to obtaining a license to use the system, is making a proper use of the patent and is not attempting to create a monopoly in an unpatented device.

6. In holding that the owner of a system patent who does not make, sell or install heating systems, but who makes certain appliances for use in said system and who grants to other manufacturers, who do not make, use, sell or install heating systems, the right under the system patent to make and sell certain of said appliances not covered by the patent, and requires the purchase of said appliances as a condition to obtain a license to use the heating system, and in said licenses to said manufacturers fixes the price of said appliances as well as fixes the price of other appliances adapted to be used in the patented system, is not violating the Anti Trust laws.

Summary of Argument.

I. The Circuit Court of Appeals for the Seventh Circuit in holding that the patent in suit is a valid patent is in conflict with the decisions of this Court in *Kingsland Liddell Company* v. *Northwest Engineering Corporation*, 294 U. S. 42; *Altoona Public Theatres, Inc.* v. *American Tri-Ergon Corp.*, 294 U. S. 477; *Mantle Lamp Company*

of America v. *Aluminum Products Co.*, 301 U. S. 544, and *Cuno Engineering Corporation* v. *The Automatic Devices Corporation*, 314 U. S. 84, and is in conflict with the judgments of the Circuit Court of Appeals for the First Circuit in *The Anderson Company et al.* v. *Lion Products Co., Inc., et al.*, 127 F. (2d) 454, and the Circuit Court of Appeals for the Third Circuit in *Ziphar American Corporation* v. *The Bates Manufacturing Company et al.*, 128 F. (2d) 380.

2. The Circuit Court of Appeals for the Seventh Circuit in holding contributory infringement, did not follow this Court's recent decisions in *Carbice Corp.* v. *American Patents Corp.*, 283 U. S. 27, and *Leitch Mfg. Co.* v. *Barber Co.*, 302 U. S. 458, but relied upon a misapprehension of this Court's earlier decision in *Leeds & Catlin Co.* v. *Victor Talking Machine Co.*, 213 U. S. 325.

3. The Circuit Court of Appeals in holding that the respondent's method of doing business does not preclude the relief sought, is in conflict with the decisions of this Court in *B. B. Chemical Co.* v. *Ellis*, 314 U. S. 495, and *Morton Salt Co.* v. *G. S. Suppiger Co.*, 314 U. S. 488, and is in conflict with the judgments of the Circuit Courts of Appeal for the Second, Third, Fourth and Seventh Circuits in *The Philad Co.* v. *Lechler Laboratories*, 107 F. (2d) 747; *Barber Asphalt Co.* v. *La Fera Grecco*, 116 F. (2d) 211; *Salvania Ind. Corp.* v. *Voskina*, 132 F. (2d) 947, and *American Lecithin Co.* v. *Warfield Co.*, 105 F. (2d) 207.

4. The Circuit Court of Appeals in holding that the acts of respondent in prohibiting the purchase from competitors of an unpatented part do not tend to create a monopoly in violation of the Anti-Trust Laws, is in conflict with the judgment of the Circuit Court of Appeals for the Third Circuit in *RCA* v. *Lord*, 28 F. (2d) 257, and with the intimation contained in the decision of this Court in *Morton Salt Co.* v. *Suppiger*, 314 U. S. 488.

July 7, 1931. E E FREEMAN 1,813,732

FURNACE CONTROL

Filed Jan. 16, 1931

FIG. 1

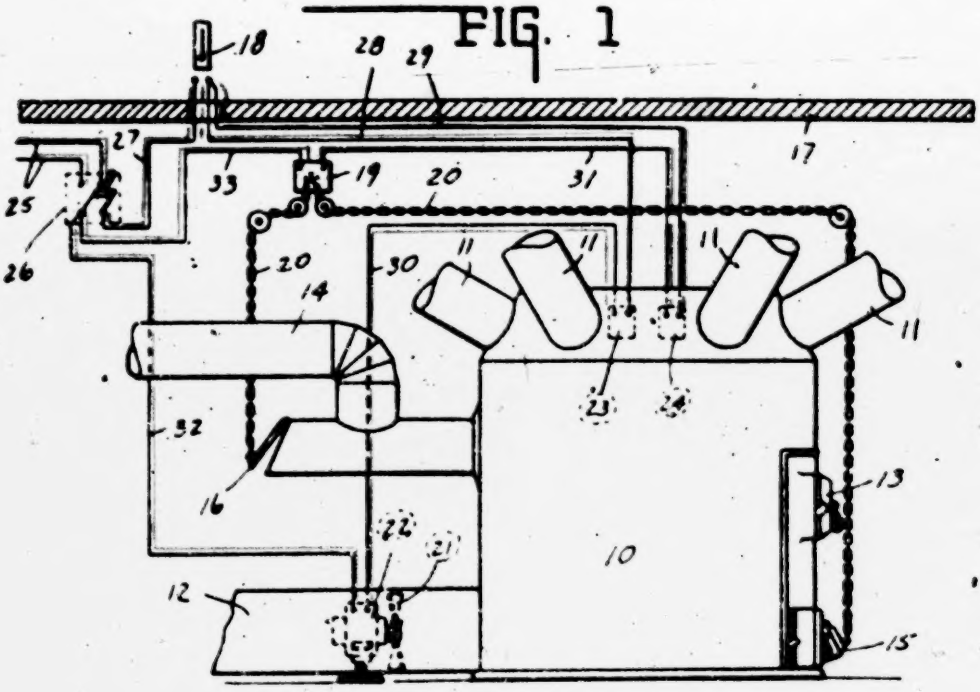
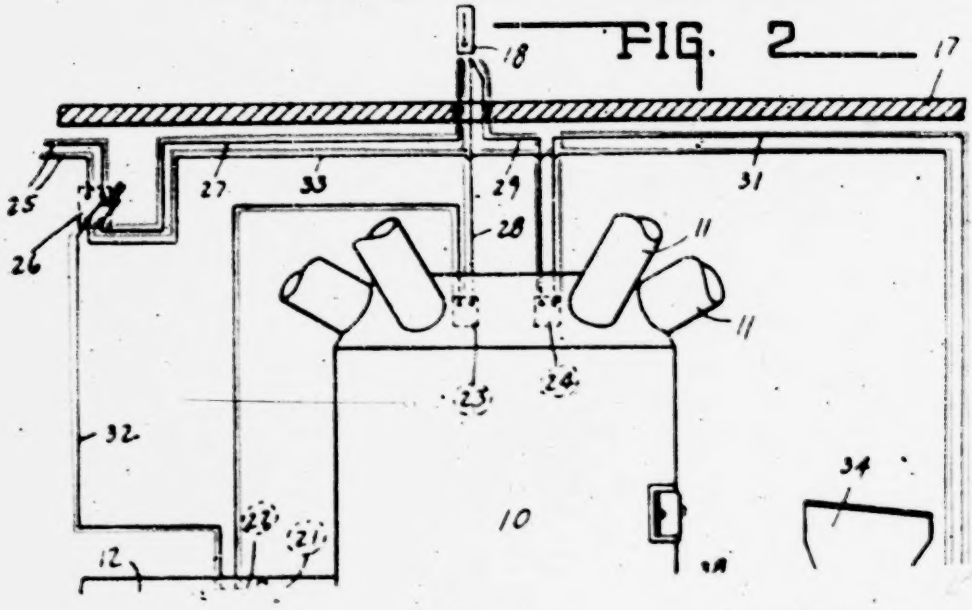


FIG. 2



First Question.

(Validity.)

The Circuit Court of Appeals in its opinion stated:

> "The District Court wrote an opinion in these cases (*Mercoid Corporation* v. *Minneapolis-Honeywell Regulator Co.*, 43 Fed. Supp. 878) in which it set forth the patent claims in issue and discussed the issues including prior art, prior uses and laches, and they will not be repeated here. It is sufficient to say that the finding could not well have been otherwise under the evidence presented, and we approve that court's reasoning and conclusions with respect to validity, infringement and laches." (R. 1226, 1227.)

For convenience, the patent drawing of the Freeman patent is here reproduced.

The figures are wiring diagrams each showing a circuit, colored red, from the source 25, through the room thermostat 18 and then through the limit control 24 to the fuel motor 19 or 35 and back to the source 25, and a circuit colored blue, from the room thermostat 18, through the furnace fan control 23 to the fan motor 22 and back to the source 25.

Freeman does not claim he invented any of the thermostatic switches used in his system, indicates them diagrammatically in his patent drawings, and admits they are old in the art (R. 436, 437, 438).

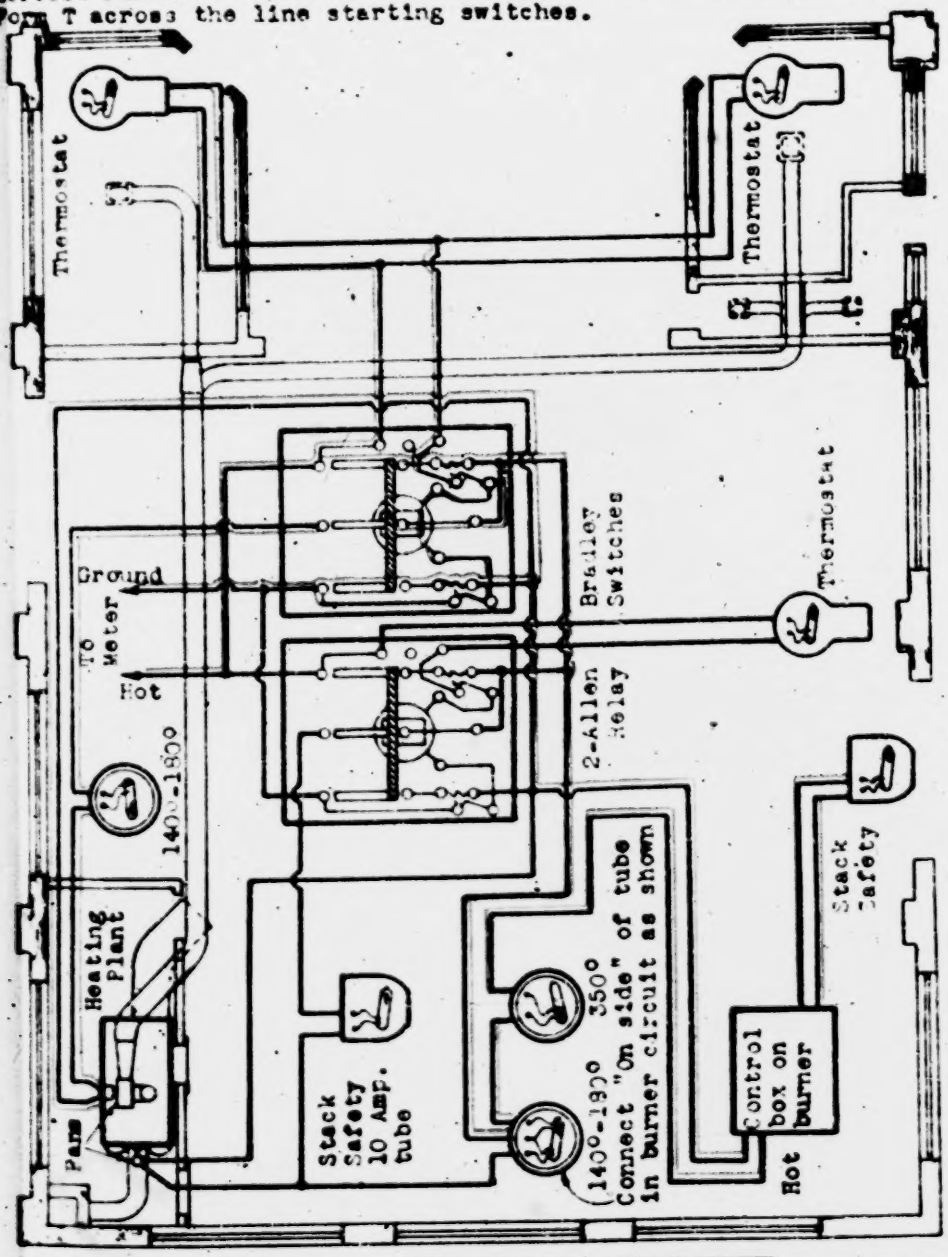
All that the Freeman patent discloses is an appropriate electrical wiring for securing old operations in heating systems, namely, a room thermostatic control of the supply of heat, limiting of the generated heat to a safe degree, and the continuation of the operation of the fan for delivering heated air from the furnace as long as there is a predetermined degree of heat in the combustion chamber, irrespective of whether fuel is supplied to the

furnace. That anyone skilled in the art could readily arrange circuits for accomplishing all that is disclosed in the Freeman patent, is clear from the following instances of what was known to the art long prior to the Freeman invention.

The record shows that Williams Oil O Matic Heating Corporation published an Installation and Service Manual (R. 683) for the use of its dealers in installing Oil O Matic oil burners and the controls therefor, including Sheet No. A 150, dated December 24, 1925 (R. 691), illustrating in a wiring diagram a warm air furnace, an Oil O Matic oil burner, a Mercoid room thermostat and a Mercoid furnace control for stopping the operation of the burner when the temperature within the warm air furnace became dangerous, and Sheet A 67, dated October 19, 1926 (R. 689), illustrating in a wiring diagram a warm air furnace, and an Oil O Matic oil burner with a furnace fan connected in circuit with a Mercoid furnace fan control which does not permit the fan to start until the air in the furnace reaches a certain heat whereupon the fan continues to run as long as the furnace is above a certain heat, irrespective of supply of fuel to the furnace.

The record also shows that the Service Manager of Williams Oil O Matic, assisted by an electrician of his department, prepared a wiring diagram dated May 5, 1927, as shown on Sheet A 198 (R. 695), for convenience here reproduced, illustrating a Mercoid room thermostat, Mercoid limit control, Mercoid furnace fan control, Oil O Matic oil burner and furnace fan applied to a warm air furnace showing, in red, a circuit from the source, through the room thermostat, through an Allen Bradley relay switch, through the limit control to the burner motor and back to the source, and in blue, a circuit from the Allen Bradley relay switch, through the furnace fan control to the fan motor and back to the relay. The closing of the

Fan type direct fired heating system showing wiring diagram with Oil-O-Matic Burner. Controls necessary for installation as shown consist of: Three standard Mercoid Thermostats. One Honeywell Stack Safety with ten amper tube. One Mercoid Hot Air Control range 140°to 180° F with ten amper tube and contact off in cold position. One Mercoid Hot Air Furnace Control range 140°to 180° F with three circuit tube. One standard Mercoid Furnace Temperature Control 350°. Two Allen-Bradley Type J-155 Form T across the line starting switches.



DRAWN BY H.V.S.
APPROVED BY O. H. P.

OILOMATIC
WILLIAMS HEATING CORPORATION
BLOOMINGTON ILLINOIS

DATE May 5-27
SHEET NO A 198

PRINTED IN U.S.A.

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room thermostat closes the Allen Bradley relay switch which closes both the red circuit to the burner motor and the blue circuit to the fan motor so that when the room thermostat closes, both the burner motor circuit and fan motor circuit are established and the furnace fan will continue to operate so long as the room thermostat calls for heat, even if the burner motor is stopped by the limit control.

The record also shows that J. A. Portner, a man who had been installing heating systems for 31 years (R. 312), on November 22, 1928, wrote Mercoid and enclosed a proposed wiring diagram for the heating system in his new place of business (R. 959), for convenience here reproduced.

This wiring diagram shows an oil burner motor, a Mercoid room thermostat #21, a Mercoid limit control #612 and a Mercoid control #35 for controlling the operation of a unit heater fan motor, with these controls arranged in circuit so that the current from the source, shown in red, passes through the room thermostat, through the limit control and burner motor back to the source, and as shown in blue, from the room thermostat, through the Mercoid control #35 and fan motor back to the source, so that the furnace fan will continue to operate so long as the room thermostat calls for heat, even if the burner motor is stopped by the limit control.

In both of these wiring diagrams of May 5, 1927, and November 22, 1928, the room thermostat normally starts the burner motor. The limit control thermostat breaks the burner motor circuit when the heat conducting medium, within the furnace reaches a predetermined high temperature. Another thermostat or fan control responsive to temperature within the furnace does not permit the fan to start until the air to be forced into the room reaches a certain heat. It then starts the fan which con-

times to run so long as the furnace is hot and the room thermostat calls for heat, even if the burner motor is stopped by the limit control.

Each of these wiring diagrams illustrate the same sequence of operation as illustrated in the Freeman patent drawing.

It is submitted that men whose business is to install automatically controlled heating systems by the use of various thermostatic devices and who have been familiar with the Mercoid controls since 1925 and have continuously made installations employing these controls in various circuits in heating systems, are men skilled in this particular art. These wiring diagrams of 1927 and 1928 are evidence of how men skilled in the art would arrange the thermostatic switches subject to furnace heat in connection with a room thermostat, fuel feed motor and a fan to force hot air from the furnace to the rooms to secure a sequence of operation whereby combustion is stopped before excessive heat is reached in the furnace but the fan continues to run and take the heated air from the furnace and deliver it to the rooms, and are persuasive that the system disclosed in the Freeman patent involves no more than the skill of the art and not invention.

The lower courts did not refer to the wiring diagrams of May 5, 1927, and November 22, 1928, in their respective opinions.

The Circuit Court of Appeals for the First Circuit in *The Anderson Company et al.* v. *Lion Products Co., Inc., et al.*, 127 F. (2d) 454, 457, held:

> "A mere aggregation of parts and processes already known in the art will not support the grant of monopoly which the patent law gives to inventive genius. A new combination of old elements alone is not patentable, and *a mere utilization of what is*

known in the prior art" even though the result is an improvement over what has gone before and even though the finished product is different in shape and form *is not invention*. Something more is required. Invention cannot be claimed unless the patentee can show by his achievement that spark of ingenuity which distinguishes invention from mere improvement. *Cuno Engineering Corporation* v. *Automatic Devices Corporation* (1941), 314 U. S. 84; *Mantle Lamp Co.* v. *Aluminum Products Co.* (1937), 301 U. S. 544; *Hotchkiss* v. *Greenwood*, (1851), 11 How. 248."

In the *Cuno Engineering* case, 314 U. S. 84, 88, as applied by the Circuit Court of Appeals for the First Circuit, this Court held that the Mead patent for a cigar lighter *was not the result of invention* but "a mere exercise of the skill of the calling," an advance "plainly indicated by the prior art", citing *Altoona Public Theatres, Inc.* v. *American Tri-Ergon Corp.*, 294 U. S. 477, 486.

The findings of this Court in the *Cuno Engineering* case are clearly stated in the words of Mr. Chief Justice Stone, 314 U. S. 84, 92, 93, 94, in his concurring opinion as follows:

> "I agree that the use of the well known thermostatically controlled heating circuit exemplified by Copeland, with the removable wireless heating unit plug of Morris, in substitution for the manually controlled circuit which had previously been used with the plug, *exhibited no more than the skill of the art*."

In the *Mantle Lamp Company* case, 301 U. S. 544, 546, 547, this Court stated:

> "We are of opinion that all the elements of the patent were old and aggregation of them *did not involve the exercise of inventive genius but of mechanical adaptation*. * * *"

Emphasis ours unless otherwise indicated.

"In short, *anyone familiar with the prior art needed only the exercise of mechanical skill to combine known methods and structures and so attain the combination exhibited in the patent.*"

The Circuit Court of Appeals for the Third Circuit in *Zephyr American Corporation v. The Bates Manufacturing Company, et al.*, 428 F. (2d) 380, 384, 385, stated:

"For the grant of a patent the statute requires that the alleged invention be new and useful (35 U. S. C. A. § 34). In determining, therefore, whether there is patentable invention in any case, it is essential that the knowledge of the prior art be considered. (Citing authorities.) Manifestly, what is already known to the art at the time of a patent application is peculiarly of material bearing on the question of the novelty of the alleged invention.

"Invention does not reside in mere skill. *Altoona Public Theaters, Inc. v. American Tri-Ergon Corp.*, 294 U. S. 477, 486; *Hansen v. Slick*, 230 F. 627, 632 (3 C. C. A.) 34). As the Supreme Court said in *Atlantic Works v. Brady*, 107 U. S. 192, 200, 'To grant a single party a monopoly of every slight advance made, except where the exercise of invention, somewhat above ordinary mechanical or engineering skill, is distinctly shown, is unjust in principle and injurious in its consequences.' An aggregation of elements, old in the art, which does not bring about a new and useful result is not invention. *Cuno Engineering Corporation v. Automatic Devices Corp.*, 314 U. S. 84; *Keystone Bridge Company v. Northwest Engineering Corp.*, *supra* (citing other authorities)."

This Court in *Altoona Public Theatres, Inc., v. American Tri-Ergon Corp.*, 294 U. S. 477, 486, 488, held:

"An improvement to an apparatus or method, to be patentable, must be the result of invention, and not the mere exercise of the skill of the calling or an

advance plainly indicated by the prior art. *Electric Cable Joint Co. v. Brooklyn Edison Co.*, 292 U. S. 69, 79, 80."

and this Court in *Keystone Driller Company* v. *Northwest Engineering Company et al.*, 294 U. S. 42, 59, held:

> "The question is then, as stated by petitioner's counsel, was invention involved in taking a known form of out digging bucket or scoop, rebuilding and applying it to the Clutter in digging excavator, and making the changes necessary, so that it would perform the alleged new functions and results of Downie. We are convinced that the fixation of the scoop to the stick, the pivoting of a drop bottom near the front of the scoop which could be unlatched to drop the contents and closed by checking the momentum of the scoop, and the addition of rake teeth at the sides of the scoop, were all old in the art and that the combination of them and adaptation of the combined result was a mere aggregation of old elements requiring not an more than mechanical skill, and was not, therefore, patentable invention."

It is therefore submitted that the Circuit Court of Appeals in the case at bar erred in affirming the judgment of the District Court that the Freeman patent was a valid patent and is contrary to the decisions of this Court in *Keystone Driller Company* v. *Northwest Engineering Company et al.*, 294 U. S. 42; *Altoona Public Theatres, Inc.* v. *American Tri-Ergon, et al.*, 294 U. S. 477; *Mantle Lamp Company* v. *Aluminum Products Co.*, 301 U. S. 544, and *The Cuno Engineering Corporation* v. *The Automatic Devices Corporation*, 314 U. S. 84, and is in conflict with the judgment of the Circuit Court of Appeals for the First Circuit in *The Anderson Company et al.* v. *Linn Products, Inc., et al.*, 127 F. (2d) 454, in the application of this Court's decision in said *Cuno Engineering* and *Mantle*

Long Creighton cases, and is in conflict with the judgment of the Circuit Court of Appeals for the Third Circuit in *Zephyr American Corporation v. The Bates Manufacturing Company, Ltd.*, 128 F. (2d) 380, in applying the decisions of this Court in the *Kenyon Boiler*, *Altoona Public Theatres* and *Cone Export* cases.

Second Question.

(Contributory Infringement.)

The sole act of petitioner held to constitute a contributory infringement of the Freeman patent is the supply of a combination furnace control for use as the controls 23 and 24 in the furnace control system disclosed in the Freeman patent.

The Circuit Court of Appeals for the Seventh Circuit held that the unpatented combination furnace control supplied by petitioner, Metcoil, was especially adapted for use in practicing the patented system, and that petitioner therefore was a contributory infringer, whereas the First and Second Circuit Courts of Appeal have held that one who supplied an unpatented part was not a contributory infringer, irrespective of whether it was an ordinary commodity or especially designed and intended for use in practicing the patented invention. The Circuit Court of Appeals in holding contributory infringement did not follow this Court's recent decisions in *Carbice Corp. v. American Patents Corp.*, 283 U. S. 27, and *Leitch Mfg. Co. v. Barber Co.*, 302 U. S. 458, but relied upon a misapprehension of this Court's earlier decision in *Leeds & Catlin v. Victor Talking Machine Co.*, 213 U. S. 325.

The Circuit Court of Appeals in its opinion states as a reason for holding contributory infringement:

> "The accused device has no other use than for a combination for the production of operations of the Free[illegible]" (R. 1228.)

This statement is in direct contravention to the judgment of the Circuit Court of Appeals for the First Circuit in *B. B. Chemical Co. v. Ellis et al.*, 117 F. (2d) 829, 834, wherein the Court stated:

> "The plaintiff seeks to prevent the application of this rule to this case by limiting the doctrine to those situations in which the alleged contributory infringer supplies staple articles of commerce. *It insists that, since the articles supplied are specially manufactured for use in this particular process, relief is not to be denied the patentee no matter what his course of business.* It points to dry ice, bituminous emulsion, and lecithin as such staple articles. . . . We do not consider that to have been intended as a limitation upon the doctrine of the *Leitch* and *Carbice* cases. The language of those cases is extremely comprehensive and *is by no means restricted to staple articles. . . . There is every indication that the Carbice and Leitch cases apply to specially designed non patented articles.* (Citing authorities.) We agree with the opinion of the Second Circuit in *Philad Co. v. Lechler Laboratories, supra*, that *the emphasis is on the fact that the articles sold by the alleged contributory infringers were not covered by the plaintiff's patent* although it conducted its business as though they were."

and is in contravention to the judgment of the Circuit Court of Appeals for the Second Circuit in *Philad Co. v. Lechler Laboratories, Inc.*, 107 F. (2d) 747, 748, wherein the Court stated:

> "It is urged that the rule of the *Carbice* case covers only an effort of a patentee to control the use of staple materials, carbon dioxide, in the *Carbice* case, bituminous emulsion in the *Leitch* case, and that the hair waving devices in the present case are not staples,

There is no support for any such limitation on the rule. *In both the Carlice case and the Leitch case the emphasis was on the fact that the articles handled by the jobber and contributory infringer were not covered by the patent* . . . ."

The Circuit Court of Appeals in the case at bar approved of the Findings of the District Court as to infringement (R. 1226, 1227). The District Court found:

"27. The Freeman patent is not a patent on either the fan switch or the limit switch or both of them. It is a patent on a system of furnace control, which requires those thermostats for its operation." (R. 1069.)

The Circuit Court of Appeals found that:

"Honeywell urges that *Freeman's advance in the art is the arrangement of thermostat switches*, subject to furnace heat, in connection with other parts, to secure a sequence of operations whereby combustion is stopped before excessive heat is reached in the furnace, but the fan continues to run and take the heated air from the furnace and deliver it to the rooms." (R. 1228.)

The Circuit Court of Appeals in its opinion also stated:

"It has long been held that the owner of a patent may restrain contributory infringement, if within his rights under the patent law; providing his conduct is otherwise proper. *Wallace v. Holmes*, 29 Fed. Cases, No. 17,100, 9 Blatchf. 65. It has been held further that one is an infringer if he makes and sells an unpatented element of a combination which serves to distinguish the invention, that is to say, to make the advance upon the prior art, knowing that it is to go into the patented combination. *Leeds & Catlin v. Victor Co.*, 213 U. S. 325." (R. 1230.)

The patent sought to be enforced is for a system of domestic heating. Does it give the patentee a monopoly of any of the old parts by which the system is operated, under this Court's decision in *Leeds & Catlin* v. *Victor Talking Machine Company*, 213 U. S. 325?

This Court in the *Lincoln Engineering* case, 303 U. S. 545, 552, referring to its decision in the said *Leeds & Catlin* case, stated:

> "*Berliner disclosed an entirely novel principle*: he utilized *the flat disc* having a smooth bottomed groove with spiral waves in its sides *not only to agitate the needle* connected to the diaphragm, *but*, in combination with a swinging arm, *to propel the needle* lengthwise the groove. In this combination, *the disc not only performed a new function* but performed it in combination *with another new element*, the swinging arm which carried the needle."

The Circuit Court of Appeals in the case at bar in its opinion found:

> "Mercoid's device, which was held to infringe the patent, is referred to by the parties as M 80.
>
> "Mercoid's M 80 is a combination fan and limit control. It has two thermostatically operated switches in a single casing so arranged as to permit the fan to operate when the limit switch has opened the circuit of the stoker motor for stopping combustion when a dangerous and excessive temperature has arisen in the furnace." (R. 1226, 1228.)

The respondent's patent expert stated:

> "Now, when we come to the M 80 we have that mechanical interconnection and, therefore, you do in one switch what the Freeman patent shows is done in two switches." (R. 440.)

The advance in the art is not in the two switches but the arrangement of the switches in the circuits to the

stoker motor and to the furnace fan. While the two switches in the M 80 may be connected in the circuits in the manner described in Mercoid's letters of 1927 and 1928 (R. 945, 947, 949, 953) or in the manner shown in Mercoid diagram 748 of 1929 (R. 829), they also may be connected in the circuits as shown in the Freeman patent.

It is the manner in which the binding posts of the respective switches are connected in the control circuit that is the "advance in the art" and not the switches *per se*, that is the invention disclosed in the Freeman patent.

Therefore, the sale by petitioner of a combination fan and light control was not a sale of the "advance in the art" of the patent in suit and does not contribute to the infringement of the patent in suit (if so, it was taught in Mercoid's letters of 1927 and 1928, R. 945, 947, 949, 953) in accordance with this Court's interpretation of the doctrine of contributory infringement of *Leeds & Catlin v. Victor Talking Machine Co.*, as expressed in this Court's decisions in *Bassick Manufacturing Co. v. Hollingshead Company*, 298 U. S. 415, and in *Lincoln Engineering Company v. Stewart Warner Corporation*, 303 U. S. 545.

The Circuit Court of Appeals in the case at bar in its opinion stated:

> "In support of its contention to the contrary, Mercoid relies upon *Carbice Corp. v. American Patents Co.*, 283 U. S. 27, and *Leitch v. Barber*, 302 U. S. 458, and kindred cases. In the *Carbice* case, the Supreme Court said that it was wholly unlike the *Leeds & Catlin* case, and in the *Leitch* case, the Court said that there was nothing in the *Leeds & Catlin* case that limited the rule in the *Carbice* case." (R. 1230)

In the *Carbice* case, 283 U. S. 27, 34, 35, this Court stated:

> "The case at bar is wholly unlike *Leeds & C. Co. v. Victor Talking Mach. Co.*, 213 U. S. 325, 333, 29

which plaintiffs rely. * * * *In the case at bar the plaintiffs neither sell nor license others to sell complete transportation packages. They supply merely one of the several materials entering into the combination; and on that commodity they have not been granted a monopoly.* Their attempt to secure one cannot be sanctioned."

Respondent's patent expert stated:

> "I do not think any of those claims specify any apparatus, Mr. Moore. *They relate to a system, a furnace control system.*" (R. 441.)

Respondent neither sells nor licenses others to sell complete furnace control systems.

In the *Leitch* case, 302 U. S. 458, 463, this Court stated:

> "The Court held in the *Carbice Corp.* case that the limitation upon the scope or use of the patent which it applied was 'inherent in the patent grant.' * * * By the rule there declared every use of a patent as a means of obtaining a limited monopoly of unpatented material is prohibited. It applies whether the patent be for a machine, a product, or a process. *It applies whatever the nature of the device by which the owner of the patent seeks to effect such unpatented extension of the monopoly. Nothing in Leeds & Catlin Co. v. Victor Talking Machine Co.*, 213 U. S. 325, *limits it.*"

It is submitted that the Circuit Court of Appeals, in holding petitioner contributed to the infringement of respondent's patent under the authority of this Court's decision in *Leeds & Catlin v. Victor Talking Machine Co.*, is in direct conflict with the decisions of the First Circuit Court of Appeals in *B. B. Chemical Co. v. Ellis*, 117 F. (2d) 829, 834, and of the Second Circuit Court of Appeals in *Philad v. Lechler*, 107 F. (2d) 747.

Third Question.

(Improper Use of Patent Precludes Maintenance of Suit.)

The patent in suit is for a domestic heating system.

Respondent does not make, use or sell heating systems but makes and sells combination furnace controls for use in heating systems. It does not grant licenses under the patent in suit to users of heating systems unless they purchase the combination furnace control from respondent, as stated on page 40 of respondent's catalog of 1940:

> "The right to use the Systems protected by the following patents is only granted to the user by Minneapolis-Honeywell Regulator Company when the particular controls as shown below are purchased from Minneapolis-Honeywell Regulator Company and used in the Systems." (R. 795.)

Respondent has granted non-exclusive licenses under the Freeman system patent to five control manufacturers (R. 479) to make, use and sell only the combination furnace control embodying the two thermostatic switches 23 and 24 of the Freeman patent not covered *per se* by the Freeman patent) (R. 896), and to convey a license only to the purchaser of each combination furnace control to use it in performing the Freeman patented system (R. 898).

The Circuit Court of Appeals in its opinion stated:

> "Mercoid contends that these licenses involve use of the patent to monopolize the sale of the control which of itself is not covered by the patent, and this it urges bars Honeywell's right to maintain an infringement suit, and also violates the Anti Trust laws. In other words, it argues that Honeywell is guilty of inequitable conduct and of violating the Anti Trust laws because it does not sell Freeman's systems, but sells unpatented controls which are not within the scope of the Freeman patent." (R. 1229, 1230.)

and held:

> "We find no evidence in this case that Honeywell by its conduct or by its licensee required anyone to buy any element or elements of the patent from Honeywell or its licensees, but all of its conduct complained of was directed to the protection of Freeman's advance in the art. This we think was well within its rights and we find no decision to the contrary. Since it has not exceeded any of its rights under the patent, on the same facts it cannot be said that it has violated the Anti-Trust laws." (R. 1231.)

The Circuit Court of Appeals found that Freeman's advance in the art was not the particular switches *per se* but:

> "* * * *the arrangement of thermostat switches*, subject to furnace heat, in connection with other parts, *to secure a sequence of operations* whereby combustion is stopped before excessive heat is reached in the furnace, but the fan continues to run and take the heated air from the furnace and deliver it to the rooms." (R. 1228.)

so that the system as described and claimed in the Freeman patent *is not completed* until the thermostatic *switches are* connected and *arranged* in circuit to secure the claimed sequence of operations, and *this complete system is Freeman's advance in the art.*

The Circuit Court of Appeals approved of the District Court's opinion as to validity and infringement (R. 1226, 1227). The District Court found:

> "27. The Freeman patent *is not a patent on either the fan switch or the limit switch or both of them. It is a patent on a system of furnace control*, which requires three thermostats for its operation." (R. 1069.)

The opinion of the Circuit Court of Appeals, therefore, puts its stamp of approval upon a method of doing business permitting the patent owner to derive its profit not from the invention on which the law gives it a monopoly, but from the sale of unpatented appliances used with it and wholly outside the scope of the patent monopoly.

The above holding of the Circuit Court of Appeals in the case at bar that respondent "has not exceeded any of its rights under the patent" is in direct conflict with the judgment of the Circuit Court of Appeals for the Second Circuit in *The Philad Co. v. Lechler Laboratories, Inc.*, 107 F. (2d) 747, 748, 749.

The Circuit Court of Appeals for the Second Circuit in affirming the decision of the District Court stated:

> "The Philad Company, owner of a patent on a process for imparting a permanent wave to the hair, patent to Mayer, reissue 18,841, brought suits for infringement against four concerns. * * * The defendants conceded that the appliances sold by them (clamps, curling rods, pads and heaters) were of shapes and sizes that fitted them for use in operating the patented process and were sold with knowledge that customers would use them in waving hair by that process. *The trial judge* dismissed the complaints without passing on the validity of the patent. He *held that the Philad Company was attempting to use the process patent to control unpatented materials and was consequently not entitled to relief.*
>
> "The Philad Company does not use the patented process, nor does it collect royalties from hair dressers for use of the process. What it does do is to issue licenses to some sixteen concerns which manufacture hair waving equipment, with authority to sublicense the process to purchasers of equipment. * * * The manufacturing concerns sell the equipment to hair dressers, in effect sublicensing them to use the pat

ented process with the equipment. *The defendants* are competitors of the licensed manufacturers in the sale of hair dressing apparatus. As already stated, their *apparatus is suitable for use in carrying on the patented process and is in fact so used, to the knowledge of the defendants. The apparatus, however, is not within the patent sued on.* * *

"In the *Carbice* case * * * The rule was laid down broadly that *where the owner of a patent* sought by means of it *to control the supply of unpatented materials* used in applying the invention, *no relief would be given in a suit for contributory infringement* against a concern which sold the unpatented materials to the trade. In the *Leitch* case the rule was reiterated and applied to a process patent. * * * It was held that the plaintiff could not have relief for contributory infringement against a concern which sold the emulsion to road builders for use in practicing the patented process. The court pointed out that the owner of the patent was using it to suppress competition in an unpatented article, *and held that the Carbice case was controlling.* * *

"The patent sought to be enforced is on a process of waving hair. It does not give the plaintiff a monopoly in the appliances by which the process is operated. *Yet the plaintiff's course of conduct shows plainly that the sole use made of the patent is to suppress competition in the appliances. It is not entitled to relief against those who sell such appliances without its leave.* * *

"In both the *Carbice* case and the *Leitch* case the emphasis was on the fact that the articles handled by the alleged contributory infringers were not covered by the patent, and on the further fact that the patentee by his method of doing business was using his patent as if it did cover such articles; * * * for present purposes the appliances are to be taken as unpatented."

The holding of the Circuit Court of Appeals in the case at bar is also in direct conflict with the judgment of the Circuit Court of Appeals for the Third Circuit in *Barber*

Asphalt Corporation et al. v. La Fera Grecco Contracting Co. et al., 116 F. 2d 211, 216, wherein the Court stated:

> "The principle enunciated by the Supreme Court in *Carbice Corp. v. American Patents Corp., supra*, is exceedingly explicit. It holds that the owner of a patent for process may not secure a partial monopoly on the unpatented material employed in it. This is precisely the effect of the agreements and licensing plans of the plaintiffs. Accordingly the court below erred in holding that the course pursued by the plaintiffs did not create an unlawful monopoly in the sale of unpatented staple material, viz., bituminous emulsions."

Furthermore, the Circuit Court of Appeals, speaking through Judge Sparks, in the case at bar in reversing the District Court's decree that:

> "Honeywell has been so using its Freeman patent as to tend to create a monopoly in an unpatented device" (R. 1071)

and in dismissing Honeywell's complaint for want of equity, is in direct conflict with its own judgment in the *American Lecithin* case wherein, speaking through Judge Kerner, it held:

> "Thus, in the instant case, *it is obvious that the sole protection sought by the patentee was of a limited monopoly for its unpatented lecithin. It did not try to obtain and income from the monopoly expressly granted by the patent itself*, either by practicing the patented method or by granting licenses for a royalty. For this reason, a different light is shed upon the rights of the patentee, *and for this reason relief is denied the patentee.* * * * The plaintiff's method of doing business had only one purpose, the doing by indirection what was prohibited directly, i.e., the securing of a monopoly in the sale of lecithin, a commodity not coming within the boundaries of the patent owned by the plaintiff. This action the courts will not sanction."

"We conclude, therefore, that the plaintiff's attempt to extend its patent monopoly beyond the boundaries described in the claims of the patent is condemned under the law. For this reason relief to the plaintiff is denied, and the decree of the district court is affirmed."

Furthermore, the said holding of the Circuit Court of Appeals in the case at bar is also in direct conflict with a later judgment of the Circuit Court of Appeals for the Fourth Circuit in *Sylvania Industrial Corporation* v. *The Viskog Corporation*, 132 F. 2d 947, wherein the Court stated:

"*The court found from these facts that the plaintiff was making use of patents owned by it, including the patent in suit, for the purpose of securing a limited monopoly of an unpatented material*, that is, plain, unprinted, regenerated cellulose sausage casings, *and concluded, therefore, that the plaintiff was not entitled to relief in this suit even though, as the court held, the patents in suit were valid and infringed by the defendant.* This legal conclusion is in accordance with the doctrine that the use of the patent monopoly to restrain competition in unpatented material is contrary to the public policy expressed in the Constitution and laws of the United States to promote the progress of science and useful arts by securing to inventors the exclusive right to their inventions for limited times. In *Morton Salt Co.* v. *Suppiger Co.*, 314 U. S. 488, 491, 492, the court said:

"'* * * It is a principle of general application that courts, and especially *courts of equity, may appropriately withhold their aid where the plaintiff is using the right asserted contrary to the public interest.*'"

Furthermore, this Court in its decision in *B. B. Chemical Company* v. *Ellis, et al.*, 314 U. S. 495, 497, in affirming the Circuit Court of Appeals, stated:

"The Courts below held that petitioner's sale to manufacturers of the unpatented materials for use by

the patented method operated as a license to use the patent with that material alone and thus restrained competition with petitioner in the sale of the unpatented material, as in *Carbice Corp. v. American Patents Corp.*, 283 U. S. 27, and *Leitch Mfg. Co. v. Barber Co.*, 302 U. S. 458."

This Court in *Mercoid Corporation v. The Mid-Continent Investment Company*, 314 U. S. 488, 491, stated:

"It is the established rule that a patentee who has granted a license on condition that the patented invention be used by the licensee only with unpatented materials furnished by the licensor, may not restrain as a contributory infringer one who sells to the licensee like materials for like use. (Citing authorities.)"

It is submitted that the Circuit Court of Appeals erred in its opinion in holding respondent was not attempting to use the patent in suit to monopolize an article beyond the bounds of the patent, in view of this Court's decision in the *Carbice* case and later decisions cited herein, and in doing so held directly contrary to the judgments of the Second, Third, Fourth and Seventh Circuit Courts of Appeals.

Fourth Question.

(Violation of the Anti-Trust Laws.)

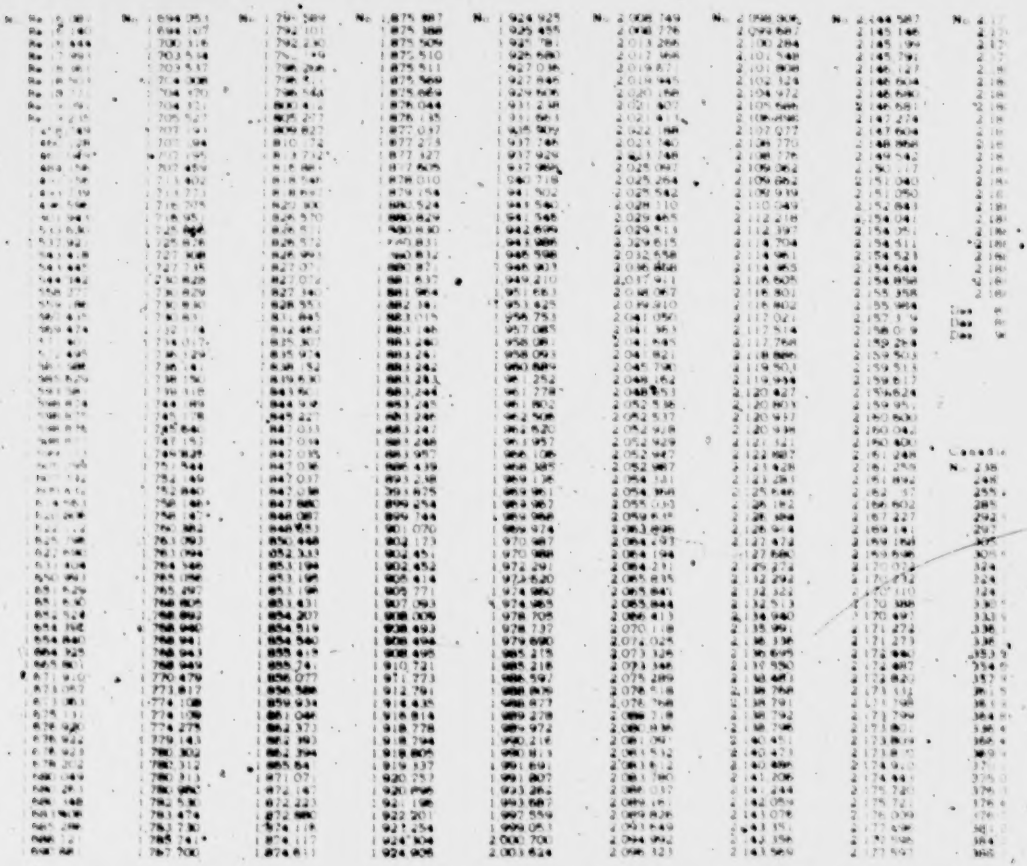
The Circuit Court of Appeals in the case at bar held that respondent had not operated in restraint of trade nor in violation of the Anti-Trust Laws when it required as a condition to use the Freeman patented system that an unpatented part thereof, namely, the combination furnace control, be purchased from it or its licensees and fixed the price of said combination furnace control as well as individual controls.

The District Court in its opinion found:

"On the charge that Minneapolis-Honeywell has been using its patent on the Freeman system of furnace

Patent Notice

Minneapolis-Honeywell Controls, T.me-O-Stat Controls and Con-Tac-Tor Mercury Sv and National Regulator Controls are manufactured and sold under the following patents either by Minneapolis-Honeywell Regulator Company or under which Minneapolis-Honeywell Re Company is licensed. Other U.S. and foreign patents are pending.



*The right to use the Systems protected by the following patents is only granted to the Minneapolis-Honeywell Regulator Company when the particular controls as shown below ar chased from Minneapolis-Honeywell Regulator Company and used in the Systems.

Patent No.	SYSTEM	CONTROLS
1,467,049	Diaphragm Gas Valve System	Any Main Fuel Valve or Safety Pilot
1,758,146	System of maintaining Stoker Fire	*Stokerswitches
1,758,147	System of maintaining Stoker Fire	*Holdfire Controls
1,785,741	Humidifying System	Humidity Responsive Controls
1,813,732	Forced Air Furnace Control System	Furnace Fan Controls

*Trade Mark

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

control as a means of creating or attempting to create a monopoly on an unpatented device, contrary to the rule laid down in the *Morton Salt* Case * * * the court is of the opinion that it must be held that *Minneapolis-Honeywell has been so using its patent as to tend to create a monopoly in an unpatented device.* Minneapolis Honeywell has been licensing others and has offered to license Mercoid to manufacture, use and sell a *single device which embodies within itself two elements of the Freeman patent*, namely, the two thermostats which are placed in the furnace hood, one being the fan switch and the other being the limit switch. * * * *The Freeman patent is not a patent on either the fan switch or the limit switch or both of them.* It is a patent on a system of furnace control, which requires three thermostats for its operation. It happens that two of those thermostats are a fan switch and a limit switch." (R. 1063.)

Respondent did not grant licenses to others to use the Freeman patented system unless the combination furnace control was purchased from it, as advertised in its Catalog of 1940, page 40 (R. 795), a copy of which for convenience is here reproduced, in which patent No. 1,813,732 is the Freeman patent here in suit.

Respondent granted licenses under the Freeman system patent to five control manufacturers to make, use and sell only the combination furnace control

"* * * on the express condition that the prices, terms and conditions of sale of 'Combination Furnace Controls' made in accordance with the terms of this agreement, shall be not more favorable to the customer than those fixed from time to time by Licensor for its own products embodying the invention covered by said agreement * * *." The prices, terms and conditions of sale shall be set forth in a schedule to be known as a 'Price Schedule' and shall be issued from time to time by Licensor and form a part of this Agreement as though herein set out in full * * * A price schedule is hereto attached and marked 'Price Schedule Exhibit A.'" (R. 909, 910.)

Page 1 of the Price Schedule Exhibit A (R. 913) for convenience is here reproduced.

Later, respondent required each licensee to sell separate switches for the same purpose as the combination furnace control at a price not less than 25c higher than the prices set forth in the Price Schedule for any specific combination furnace control. This restriction was embodied in a separate letter to each licensee (R. 1051) and a copy of one of such letters for convenience is here reproduced.

Both the trial court and the Circuit Court of Appeals are silent as to Mercoid's charges that by these licenses respondent *is attempting to fix the price upon an unpatented device*, in violation of the Anti Trust laws.

The Court of Appeals in its opinion stated:

> "In this we think there is no attempt to illegally monopolize the sale of the Honeywell control unless it is used or intended to be used in the Honeywell system. * * * Since it has not exceeded any of its rights under the patent, on the same facts it cannot be said that it has violated the Anti Trust laws." (R. 1229, 1231.)

and then held:

> "The decree of the District Court is affirmed in all respects, except as to its decree that Honeywell has been so using its Freeman patent as to tend to create a monopoly in an unpatented device, and in dismissing Honeywell's complaint, and in the assessment of costs. In these respects the decree is reversed." * * * (R. 1234.)

While this Court has repeatedly held that the attempt to use a patent unreasonably to restrain commerce is condemned under the Anti Trust Laws or to use a patent as a means of obtaining a limited monopoly of unpatented material is prohibited, yet it has never passed upon the question that such use of a patent *is* a violation of the Anti Trust Laws *and applied the penalties thereunder* so far as respondent's counsel has been able to discover.

COPY



PRICE SCHEDULE - EXHIBIT A

Price Schedule forming a part of license agreement involving Freeman Patent No. 1,813,732.

MANUFACTURER

A manufacturer shall be defined as any firm manufacturing and marketing equipment with which Combination Furnace Controls are sold as an original part of, or necessary accessor to their product.

Manufacturer's Price.

The net minimum price for a Combination Furnace Control shall be . . . . . $ 5..

The net minimum price for a Combination Furnace Control including a summer switch (manually operable on and off switch for the fan) shall be . . . . . 5.

The net minimum price for a Combination Furnace Control operable at two speeds shall be . . . . . 7.

The net minimum price for a Combination Furnace Control operable at two speeds including a summer switch (manually operable on and off switch for the fan) shall be . . . . . 7.

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AUTOMATIC CONTROLS MH

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

M-H AUTOMATIC CONTROL SYSTEMS BROWN INDUSTRIAL INSTRUMENTS NATIONAL PNEUMATIC CONTROLS

MINNEAPOLIS, MINN

April 18, 1939.

Perfex Corporation,
415 West Oklahoma Place,
Milwaukee, Wisconsin.

Gentlemen:

In connection with our license agreement to you under the Freeman Patent No. 1,813,732, we agree that so long as you do not sell separate heating medium temperature responsive controls for carrying out the system of the Freeman patent at a combined price which is less than 25¢ higher than the prices set forth in the Price Schedule of the agreement for any specific "Combination Furnace Control" comparable to carrying out in operation and function what the separate controls would do, we will not assert our rights against you or your customers under the Freeman Patent on account of such sales.

Yours very truly,

W. L. Huff - Vice President & Treasurer.

WLF:med

This Court in the *Morton Salt* case, 314 U. S. 488, 490, 491, 494, stated:

> "The Clayton Act authorizes those injured by violations tending to monopoly to maintain suit for treble damages and for an injunction in appropriate cases. 15 U. S. C. A., § 1, 2, 14, 15, 26."

and held:

> "It is unnecessary to decide whether respondent has violated the Clayton Act, for we conclude that in any event the maintenance of the present suit to restrain petitioner's manufacture or sale of the alleged infringing machines is contrary to public policy and that the district court rightly dismissed the complaint for want of equity."

The holding of the Circuit Court of Appeals that respondent has not violated the Anti Trust Laws is in direct conflict with the judgment of the Circuit Court of Appeals for the Third Circuit in *Radio Corporation of America v. Lord et al.*, 28 F. (2d) 257, 261, 262; certiorari denied 278 U. S. 648, in which Lord *et al.* alleged RCA violated U. S. C. Title 15, §§ 1, 2 and 14, by licensing purchasers of its vacuum tubes to make and use its patented radio receiving sets only when using vacuum tubes purchased from RCA. The Circuit Court of Appeals affirmed the findings of the District Court that the effect of this licensing arrangement was substantially to lessen competition and tended to create a monopoly in violation of the Anti Trust laws, stating:

> "* * * the practical effect of paragraph 9 was to prevent the licensees from using or dealing in tubes other than those sold by the defendant; that its provisions were as effective as express covenants would be, *and practically compelled the use of the tubes of the defendant in all receiving sets made by the licensees*, except upon risks which manufacturers will

not incur; and that such agreements were prohibited by the Clayton Act. *Standard Fashion Co. v. Magrane Houston Co.*, 258 U. S. 346, 355, 42 S. Ct. 360, 66 L. Ed. 653; *United Shoe Machinery Corp. v. United States*, 258 U. S. 451, 457, 458, 42 S. Ct. 363, 66 L. Ed. 708."

This holding of the Circuit Court of Appeals in the case at bar is in direct conflict with the judgment of the Circuit Court of Appeals for the Third Circuit in *Barber Asphalt Corporation et al. v. La Fera Grecco Contracting Co., et al.*, 116 F. (2d) 211, 216, wherein the court stated:

> "We have gone into the nature of the licensing agreements because they are put squarely in issue by the counterclaim. * * * *the subject matter of the counterclaim is one with which the Anti Trust Laws of the United States are concerned.* Jurisdiction of that subject matter is vested in courts of the United States and the court below had jurisdiction of all the parties. *The counterclaim sets up a cause of action independent of the validity or invalidity of the Hayden patent.*
>
> "Accordingly, the judgment of the court below is reversed and the cause is remanded with directions to dismiss the complaint for want of equity, to reinstate the counterclaim and to enter judgment granting relief thereunder."

Petitioner's complaint, in the case at bar, is for a declaratory decree that respondent has violated the Anti-Trust Laws.

This Court has never passed upon this question under the circumstances set forth in the record, so far as petitioner has been able to discover.

This Court in regard to price fixing stated in *Ethyl Gasoline Corporation et al. v. United States of America*, 309 U. S. 436, 452, 456, 457, 458, 459:

"*Agreements for price maintenance of articles moving in interstate commerce are*, without more, *unreasonable restraints within the meaning of the Sherman Act* because they eliminate competition. *United States v. Trenton Potteries Co.*, 273 U. S. 392 * * *."

This Court in *United States v. Univis Lens Co.*, 316 U. S. 241, 251, 252, 253, stated:

"*The price fixing features of appellees' licensing system*, which are not within the protection *of the patent law, violate the Sherman Act.* * * *."

This Court in *Sola Electric Company v. Jefferson Electric Company*, announced December 7, 1942, in 87 L. Ed. Advance Opinions, 150, 152, involving price fixing licenses granted under a patent, stated:

"*The present license contract contemplates and requires that petitioner*, on sales of the licensed transformers throughout the United States, *shall conform to the prices fixed by respondent* for the sale of competing patented articles by other licensees and by respondent. * * * *Agreements fixing the competitive sales price, of articles* moving interstate, not within the protection of a patent, *are unlawful because prohibited by the Sherman Act.*"

It is therefore submitted that the Circuit Court of Appeals erred in view of the above cited authorities in reversing the District Court's decree that respondent has been so using its Freeman patent as to tend to create a monopoly in an unpatented device, and in failing to find that by respondent's licensing arrangement and price fixing agreements it violated the Anti-Trust Laws.

Conclusion.

For the reasons above stated, it is urged that this petition for writ of certiorari be granted, especially in view of the conflicting interpretations of this Court's decisions by the Circuit Court of Appeals for the Seventh Circuit in the case at bar and the Circuit Courts of Appeal for the First, Second, Third, Fourth, and Seventh Circuits, and the federal questions relating to violation of the Anti-Trust laws.

Respectfully,

LANGDON MOORE,

GEORGE L. WILKINSON,
Counsel for Petitioner.

Chicago, Illinois,
April 28, 1943.

IN THE

Supreme Court of The United States

October Term, A. D. 1942

No. 994

No. 995

THE MERCOID CORPORATION,
Petitioner

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Respondent

PETITIONER'S REPLY TO RESPONDENT'S BRIEF.

GEORGE E. WILKINSON,
Counsel for Petitioner

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IN THE

Supreme Court of The United States

October Term, A. D. 1942

No. 994
No. 995

THE MERCOID CORPORATION,
Petitioner,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Respondent.

ON PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SEVENTH CIRCUIT

PETITIONER'S REPLY TO RESPONDENT'S BRIEF.

Respondent admits that the "advance in the art" of the Freeman patent "in suit resides" in the "provision of elements in a new arrangement for a particular sequence of operation"; that the licenses it has granted "provide for the payment of a royalty of 25 cents on each specifically defined 'combination furnace control'" (which is merely one of the several elements in the "sequence of operations"),

and that the "licenses fix minimum prices at which the licensees sell the defined combustion furnace controls."

Respondent therefore admits that its income under its patent is merely from one of the elements of the "new arrangement" of elements, which constitutes Freeman's "advance in the art," and further admits that it fixes the selling prices, not on the combination of elements alleged to be covered by the patent, but on merely one element not *per se* within the patent monopoly.

These admissions clearly support Petitioner's contention that the judgment of the Appellate Court in holding lawful the practices of the Respondent is in conflict with decisions of other Circuit Courts of Appeals, and inconsistent with decisions of this Court.

This Court has this day granted Petitioner's petition for writ of certiorari in *Mercoid Corp., Petitioner, vs. Mid Continent Investment Company and Minneapolis-Honeywell Regulator Co., Respondents*, Nos. 973 974, which presents the same questions as presented in the petition in the instant case, except that in the instant case there is the additional point that the practice of the Respondent includes fixing prices on an unpatented part, *i.e.*, the furnace control, which is merely one of the several elements of the patented system.

First Question — Validity of Freeman Patent.

Respondent contends that in petitioning this Court for consideration of the validity of the Freeman patent, Petitioner is merely seeking a review of facts. If there were an issue as to the disclosures of the prior art patents, in view of which Petitioner urges that the Freeman patent is invalid as involving no invention, then Respondent's contention would be correct, but as there is no such issue of fact, the question whether Freeman made an inven-

tion is one of law. This Court in *Market Street Ry. Co.* v. *Roche*, 155 U. S. 621, 625, stated the law as follows:

> "The defendant put in evidence a number of patents prior in date to the plaintiff's, and asked the court to compare the inventions and devices therein described with those claimed by the plaintiff. No extrinsic evidence was given or needed to explain terms of art, or to apply the descriptions to the subject-matter, so that the court was able, from mere comparison, to say what was the invention described in each, and to affirm from such mere comparison whether the inventions were or were not the same. The question was, then, one of pure construction and not of evidence, and consequently was matter of law for the court, without any auxiliary fact to be passed upon by the jury.
>
> "If, upon the state of the art as shown to exist by the prior patents, and upon a comparison of the older devices with those described in the patent in suit, it should appear that the patented claims are not novel, it becomes the duty of the court to so instruct the jury."

In support of Petitioner's contention that validity should be considered by this Court, reference is again made to this Court's decision in *Manic Gear Works, Inc., et al.* v. *Oatboard, Maxim & Manufacturing Co., et al.*, 315 U. S. 759, 768, wherein this Court stated:

> "We think the conclusion is inescapable that there was public use, or sale, of devices embodying the asserted invention, more than two years before it was first presented to the Patent Office. We are not foreclosed from a decision under 4886 on the point by the obscurity of its presentation in the courts below. This issue has been fully presented to this Court by the petition for a writ of certiorari, and in subsequent briefs and argument; and there is not the slightest indication that respondents have been prejudiced by such obscurity. To sustain the claims in question upon

the established and admitted facts would require a plain disregard of the public interest sought to be safeguarded by the patent statutes, and so frequently present but so seldom adequately represented in patent litigation."

Second Question — Contributory Infringement.

Respondent correctly states that when the control M-80, manufactured and sold by Petitioner, is installed by the purchaser, together with the other elements of Freeman's "advance in the art" not supplied by Petitioner, the Freeman patent is infringed. Respondent, however, ignores the fact that as the control M-80 is not yet so covered by the Freeman patent, Petitioner, as well as the public generally, has the right to manufacture, sell and use it free from the limited monopoly of the Freeman patent.

While many decisions favorable to defendants charged with contributory infringement of patents have been primarily based upon the improper use of their patents by the plaintiffs, yet some of them have clearly held that one who furnishes an unpatented part knowing it will be used by the purchaser in connection with other parts to infringe a patent, is not legally a contributory infringer of the patent.

The Court of Appeals for the Second Circuit in *Philad* [illegible], 107 F. (2d) 747, 748, stated with reference to the decisions of this Court in *Carbice* v. *American* [illegible], 283 U. S. 27, and *Leeds* [illegible] v. *Barber*, 302 U. S. 458:

> "[illegible] does not decide [illegible] contributory infringement [illegible]. On contributory infringement [illegible] product is [illegible] the case where [illegible] exploits it in the ordinary manner and the case where he employs it primarily as a means of suppressing competition in unpatented

materials used in connection with it. The present cases are obviously of the latter type."

In both the *Carbice* and the *Leitch* cases the defendants were charged with contributory infringement of the patents in those suits by reason of their sale of an unpatented part for use by the purchasers in infringing the patented inventions. This Court in both of said cases reversed the judgment of the lower courts that the defendants had been guilty of contributory infringement.

Third Question — Improper Use of Freeman Patent.

Respondent contends that its practices in exacting from its licensees a royalty merely on one element, *viz.*, a furnace control, of the Freeman system, and not upon the patented system, and in fixing the minimum selling prices of such element, are not improper because the said furnace control is the Freeman "advance in the art" or the "essence of Freeman's patent."

The furnace control is merely one of several elements constituting the Freeman system, all of which elements are essential to the "particular sequence of operations" which Respondent contends was Freeman's "advance in the art." The control would be useless without the other cooperating elements.

It is a well established principle of patent law that when a patented invention resides in a combination of cooperating elements, all of the elements, and no one of them alone, constitutes the "advance in the art" and the "essence of the patent."

This Court in *Schumaker v. Cornell*, 96 U. S. 549, 554, stated the law as follows:

> "The patent is 'well entitled to an improvement.' It could be for nothing more.
>
> "Nothing is claimed separately. Every thing is claimed together and in the aggregate. If any thing

was withdrawn, and no equivalent supplied in its place, the instrument would be a failure. Each element is a part of a compound unit, and is necessary to the completeness and efficacy of the result."

This Court in *Russell* v. *Lindsay*, 113 U. S. 97, 101, again stated the law upon this point as follows:

"The patent of the plaintiffs is for a combination only. None of the separate elements of which the combination is composed are claimed as the invention of the patentee, therefore none of them standing alone are included in the monopoly of the patent. As was said by Mr. Justice Bradley in the case of *The Corn Planter Patent*, 23 Wall. 181, 224: 'Where a patentee, after describing a machine, claims as his invention a certain combination of elements, or a certain device, or part of the machine, this is an implied declaration, as conclusive, so far as that patent is concerned, as if it were expressed, that the specific combination or thing claimed is the only part which the patentee regards as new. True, he or some other person may have a distinct patent for the portions not covered by this, but that will speak for itself. So far as the patent in question is concerned, the remaining parts are old or common and public.' See also *Merrill* v. *Yeomans*, 94 U. S. 568, 573; *Water Meter Co.* v. *Desper*, 101 U. S. 332, 337; *Wilkin* v. *Brass Co.*, 101 U. S. 350. These authorities dispose of the contention of the plaintiff's counsel that their patent covers one of the separate elements which enters into the combination, namely, a 'slotted wooden beam,' because, as they contend, that element is new, and is the original invention of the patentees."

This Court in its later decision in *Leeds & Catlin* v. *Victor*, 213 U. S. 301, 318, again stated the law as follows:

"Certainly, one element is not the combination . . . [illegible] . . . part of the invention represented by the com-

> bination, and it can make no difference whether the element was always free or becomes free by the expiration of a prior patent, foreign or domestic."

The Court of Appeals, in view of the foregoing authorities, was in error, as a matter of law, in holding that the furnace control, which is only one of several cooperating elements of the combination in which Freeman's system resides, is the "advance in the art" or the "essence of Freeman's patent."

Fourth Question — Violation of Anti-Trust Laws.

While Respondent admits that it fixes the prices at which its licensees must sell the furnace control, one of the several elements of the Freeman patented system, it omits reference to the fact that it requires its licensees to purchase the furnace controls for use in the system from it. Respondent states its practice on page 40 of its catalog of 1940 (R. 795) as follows:

> "The right to use the Systems protected by the following patents is only granted to the user by Minneapolis Honeywell Regulator Company who or the particular controls as shown below are purchased from Minneapolis Honeywell Regulator Company and used in the Systems."

Consequently, Respondent ignores the direct conflict between the judgment of the Court of Appeals in the instant case with that of the Court of Appeals for the Third Circuit in *R.C.A. v. Loew*, 28 F. (2d) 257.

Respondent in asserting that it does not require licensees to do anything whatsoever in regard to standard controls overlooks the fact that it fixes the prices on controls of other than its so called "combination furnace control" (R. 1651).

Respondent urges that the decision of this Court in *U. S. v. Univis Lens Co.*, 316 U. S. 241, supports as legal the practice of fixing prices on an unpatented article, namely, the lens blanks. This Court did not so hold, but held that the blanks in effect were a patented article, the sale of which precluded fixing the prices of the finished lens, on the ground that the sale of the lenses was merely a resale of the blanks.

This Court in its said decision did not have before it and did not approve of the practices of Respondent in requiring licensees to purchase an unpatented part from it, and in fixing prices on an unpatented element of a patented combination.

CONCLUSION.

Petitioner submits that Respondent's brief does not meet the points nor the reasons presented in support of the petition for writ of certiorari.

Respectfully,

GEORGE L. WILKINSON,
Counsel for Petitioner.

Chicago, Illinois,
June 1st, 1943.

IN THE

Supreme Court of The United States

OCTOBER TERM, A. D. 1943

Nos. 58, 59.

THE MERCOID CORPORATION,
Petitioner,

vs.

MINNEAPOLIS HONEYWELL REGULATOR COMPANY,
Respondent.

BRIEF FOR PETITIONER.

GEORGE L. WILKINSON,
Counsel for Petitioner.

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IN THE

Supreme Court of The United States

OCTOBER TERM, A. D. 1943.

Nos. 58, 59.

THE MERCOID CORPORATION,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,

Respondent.

BRIEF FOR PETITIONER.

OPINION OF THE COURT BELOW.

The memorandum opinion of the District Court for the Northern District of Illinois, Eastern Division, was filed February 27, 1942 (R. 1059), and the Findings of Fact and conclusions of law (R. 1065) were filed and a decree (R. 1070) entered on March 24, 1942.

The opinion of the Circuit Court of Appeals for the Seventh Circuit was filed December 23, 1942 (R. 1225), and judgment pursuant thereto was entered on the same date (R. 1232). The opinion is reported in 133 F. (2d) 811.

NOTE: Emphasis, unless otherwise stated, is ours. The petitioner will be designated Mercoid and the respondent Minneapolis-Honeywell.

STATEMENT OF GROUNDS OF JURISDICTION.

This is a suit arising under the patent laws, 28 U. S. C. Sec. 41(7); under the Declaratory Judgment Act, 28 U. S. C. Sec. 400, and under the Anti-Trust laws.

The jurisdiction of this Court is invoked under 28 U. S. C. Sec. 347.

CONCISE STATEMENT OF THE CASE.

Petitioner, Mercoid, on June 29, 1940 filed a complaint (R. 2) in the District Court for the Northern District of Illinois, Eastern Division, for a declaratory judgment that the Freeman patent No. 1,813,732, issued July 7, 1931 for Furnace Control (R. 1100), owned by respondent, Minneapolis-Honeywell, is invalid; that petitioner's fan and limit controls do not infringe, nor contribute to the infringement of, said patent, and that respondent is not entitled to extend its patent monopoly to include petitioner's fan and limit controls not covered *per se* by said Freeman patent (R. 2).

Respondent, before answering petitioner's complaint, filed a bill of complaint (R. 38) on July 1, 1940 charging petitioner with infringement, and contributing to the infringement, of said Freeman patent. Respondent filed its answer to petitioner's complaint on July 19, 1940 (R. 8). Petitioner on September 20, 1940 filed its answer (R. 48) to respondent's complaint, averring that the claims of the Freeman patent are invalid; that respondent is utilizing the Freeman patent to establish a monopoly in the sale of combination furnace controls *per se* not coming within the boundaries of the Freeman patent, and a counterclaim for declaratory judgment. Respondent filed its reply to petitioner's counterclaim on October 14, 1940 (R. 62).

On January 7, 1941 petitioner filed a supplemental complaint (R. 24) for declaratory judgment, asserting that

respondent has granted licenses to five competing control manufacturers to make, use and sell combination furnace controls not covered by the Freeman patent; that respondent has deliberately conspired with its licensees, and said licensees have willfully and unlawfully conspired with respondent, and among themselves, to substantially lessen competition and establish a monopoly in the sale of unpatented furnace controls in restraint of trade, and that respondent has established minimum prices for the sale of individual controls, not covered by the patent, in violation of the Anti-Trust laws. Respondent answered petitioner's supplemental complaint on January 28, 1941 (R. 31), and thereafter the two suits were consolidated (R. 67) and tried together.

The District Court rendered an opinion on February 27, 1942 (R. 1059), entered Findings of Fact and Conclusions of Law on March 24, 1942 (R. 1065), and a final decree (R. 1070) on the same day, adjudging that the said Freeman patent is valid; that petitioner has contributed to the infringement of said patent; that respondent has been so using its said patent as to tend to create a monopoly in an unpatented device; that each of the complaints be dismissed for want of equity, and that each of the parties pay one-half of the taxable costs.

An appeal and cross-appeal were duly taken by respondent (R. 1071) and petitioner (R. 1075) to the United States Circuit Court of Appeals for the Seventh Circuit, and on December 23, 1942 the said Court filed its opinion (R. 1225) and its judgment pursuant thereto (R. 1232), affirming the decree of the District Court "except as to its decree that Honeywell has been so using its Freeman patent as to tend to create a monopoly in an unpatented device, and in dismissing Honeywell's complaint and in assessment of costs, and in these respects the decree is reversed."

A petition for rehearing (R. 1236) was duly filed, and on March 27, 1943 denied (R. 1237).

Petitioner filed in this Court a petition for a writ of certiorari, which was granted on June 7, 1943 (R. 1242).

ERRORS RELIED UPON.

The Circuit Court of Appeals for the Seventh Circuit erred:

(1) In holding that the respondent, Minneapolis-Honeywell, in endeavoring to monopolize under its patent an unpatented device, has not so used its patent as to be denied relief.

(2) In holding that the acts of respondent in requiring as a condition to a license under the Freeman patent the purchase from it of an unpatented control, and in fixing the minimum prices at which licensees must sell such unpatented control, do not violate the Anti-Trust laws.

(3) In holding that respondent may restrain as a contributory infringer petitioner, who makes and sells an unpatented control for use by purchasers in installing and using the patented system of furnace controls.

(4) In holding that the Freeman patent discloses invention and is valid, and in not holding that the system of furnace controls disclosed and claimed in the Freeman patent merely comprises an obvious and unpatentable assembly of non-cooperating parts, and that the patent is invalid.

SUMMARY OF ARGUMENT.

(1) Respondent derives its entire revenue from its Freeman patent through the sale, and licensing others to sell, unpatented thermostatic switches entitled "Combination Furnace Controls," and not from the installation or use of the patented system of furnace controls. It requires as a condition to a license under the patent in suit that the

unpatented controls for use in installing and using the patented system, be purchased from it. It asserts through this suit and notices to the trade that the making and selling of an unpatented control for use in practicing the patented system, should be enjoined as violations of its patent monopoly. Respondent through its operations is endeavoring to so extend its monopoly as to suppress competition in the manufacture and sale of a control not patented *per se*, and therefore is not entitled to relief.

Carbice Corp. v. *American Patents Corp.*, 283 U. S. 27;
Leitch Mfg. Co. v. *Barber Co.*, 302 U. S. 458;
B. B. Chemical Co. v. *Ellis*, 314 U. S. 495;
Morton Salt Co. v. *G. S. Suppiger Co.*, 314 U. S. 488;
J. C. Ferguson v. *American Lecithin Co.*, 94 F. (2d) 729; C. C. A. 1;
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Barber Colman Co. v. *National Tool Co.*, 58 U. S. P. Q. 2; C. C. A. 6;
American Lecithin Co. v. *Warfield Co.*, 105 F. (2d) 207; C. C. A. 7.

(2) The acts of respondent requiring the purchase from it of an unpatented part tends to substantially lessen competition and create a limited monopoly, and its practice in fixing the minimum sales prices of an unpatented control constitutes violation of the Anti-Trust laws.

United Shoe Machinery Co. v. *U. S.*, 258 U. S. 451, 460;

Carbice Corp. v. *American Patents Corp.*, 283 U. S. 27, 31;

Ethyl Gasoline Corp. v. *U. S.*, 309 U. S. 436, 456;

Morton Salt Co. v. *G. S. Suppiger Co.*, 314 U. S. 488;

Solo Electric Co. v. *Jefferson Electric Co.*, 317 U. S. 173;

R. C. A. v. *Lord*, 28 F. (2d) 257; C. C. A. 3.

(3) The petitioner neither installs nor uses the system covered by the Freeman patent. The sole acts of petitioner held to constitute contributory infringement of the Freeman patent are the manufacture and sale of *per se* unpatented thermostatic switches termed "Combination Furnace Controls," for use by purchasers in installing and using the system of furnace control of the Freeman patent, and therefore it is not liable as a contributory infringer of the Freeman patent.

Carbice Corp. v. *American Patents Corp.*, 283 U. S. 27;

Leitch Mfg. Co. v. *Barber Co.*, 302 U. S. 458;

Morton Salt Co. v. *G. S. Suppiger Co.*, 314 U. S. 488;

B. B. Chemical Co. v. *Ellis*, 314 U. S. 495;

The Philad Co. v. *Lechler Laboratories*, 107 F. (2d) 747; C. C. A. 2;

J. C. Ferguson Co. v. *American Lecithin Co.*, 94 F. (2d) 729; C. C. A. 1.

(4) The alleged novelty of the Freeman patent in suit merely resides in providing a hot air furnace with two circuits, each separately controlled, one containing a thermostatic switch for governing the operation of a fan for

blowing heated air from the furnace into the spaces to be heated, and the other circuit comprising a thermostatic switch for limiting the supply of fuel, or the rate of combustion, when a predetermined degree of temperature is reached. The Freeman patent therefore does not cover a patentable combination of cooperating elements, but a mere unpatentable aggregation of old elements which in their new relation perform no other or additional functions than those which they previously performed.

Altoona Publix Theatres v. *American Tri-Ergon Corp.*, 294 U. S. 477;

Mantle Lamp Co. v. *Aluminum Products Co.*, 301 U. S. 544;

Cuno Engineering Corp. v. *Automatic Devices Corp.*, 314 U. S. 84;

Toledo Pressed Steel Co. v. *Standard Parts, Inc.*, 307 U. S. 350;

Textile Machine Co. v. *Louis Hirsch Textile Machines, Inc.*, 302 U. S. 490.

ARGUMENT.

Freeman Patent in Suit.

The Freeman patent No. 1,813,732 (R. 1100), granted July 7, 1931 on an application filed January 16, 1931, relates to hot air furnaces, and the alleged invention resides in means for controlling the supply of heated air to the space to be heated and means for controlling the rate of combustion. The specification states as follows the object of the invention:

> "The principal object of the invention is to provide a control for the rate of combustion and for the operation of an accelerating device, such as a fan, blower or similar apparatus, used for accelerating the rate of supply of the heat-conducting medium, such as air, to be heated by the furnace, said control being such

as to permit the operation of said accelerating device and to check combustion in case the furnace becomes overheated and such as to interrupt the operation of said accelerating device while increasing the rate of combustion if the furnace has not been heated above a predetermined temperature.

"In addition, a control feature is added by means of which both the combustion and the supply of the heat-conducting medium are checked when the temperature of the room or object to be heated is above a predetermined degree."

For convenient reference, the drawing of the Freeman patent is here reproduced, on which the fan circuit for controlling the supply of heated air is colored blue, and the circuit for controlling the fuel combustion is colored red.

The blue circuit includes the motor 22 of the fan 21 and a thermostatic switch 23 located in the bonnet of the furnace. The red circuit, in Figure 1, includes the motor 19 for opening and closing the dampers 15 and 16, and in Figure 2 the motor 35 for supplying fuel from the stoker hopper 34 to the furnace, and the thermostatic switch 24 located in the bonnet of the furnace. Of course both circuits include the usual room thermostat 18.

When the temperature in the room to be heated is below a predetermined degree, the room thermostat 18 closes the circuits through the separate thermostatic switches 23 and 24, one circuit for the fan motor 22, and the other circuit for the motor 19, Figure 1, or 35, Figure 2, for opening and closing the dampers or supplying fuel to the furnace. When the temperature in the bonnet is above a predetermined degree, the fan operates to supply air to the furnace and thence to the rooms to be heated, and continues to do so as long as the temperature in the bonnet is such as to maintain the thermostatic switch 23 closed irrespective of

Filed Jan. 16, 1931

FIG. 1

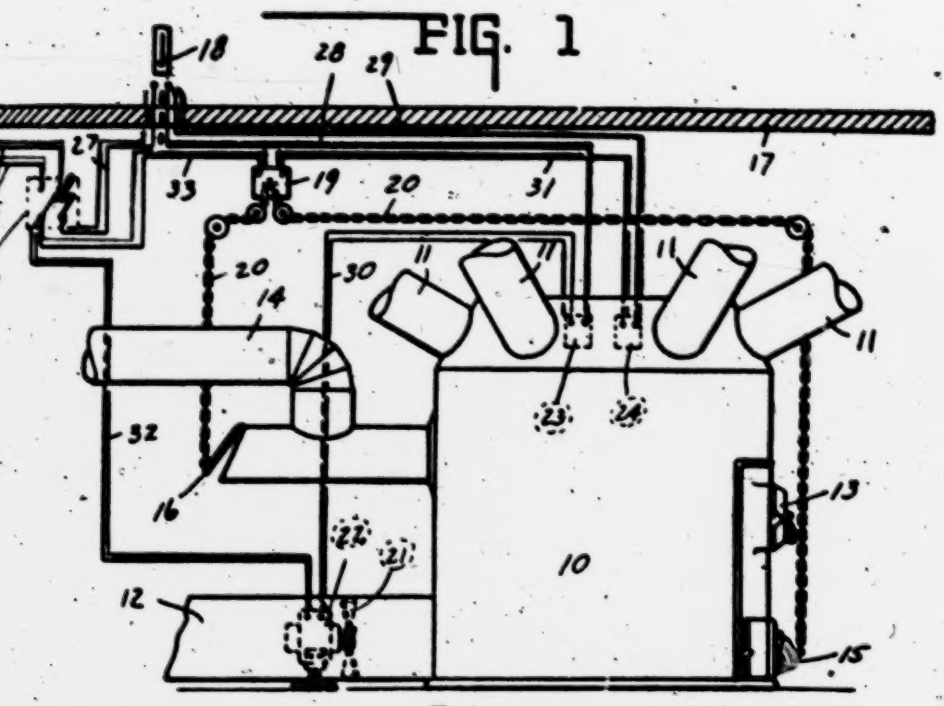
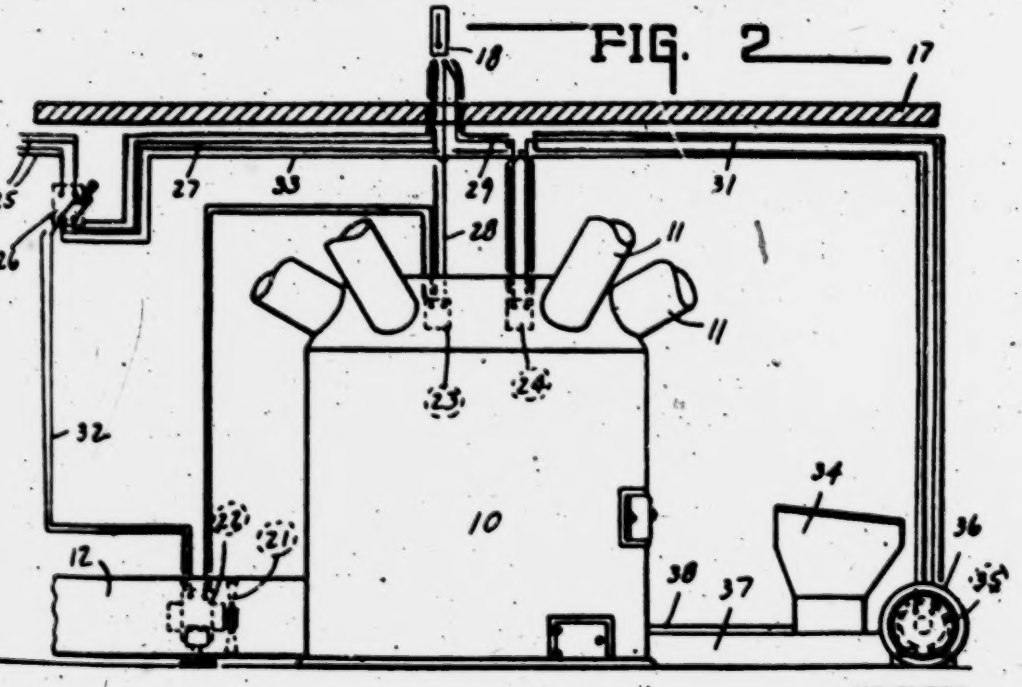


FIG. 2



INVENTOR.
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BY
Lakewood Lakewood Goldsmith & Co.
ATTORNEYS.

whether the temperature is such as to open or close the circuit through the thermostatic switch 24. On the other hand, the red circuit is closed to the motor for controlling the rate of combustion when the temperature in the bonnet is below a predetermined degree, irrespective of whether the thermostatic switch 23 is in position to open or close the fan circuit.

There is no sequence of operation as the fan and limit switches operate independently of each other. The fan switch may be opened and the limit switch closed, or the fan switch may be closed and the limit switch opened, or both switches may be opened or closed at the same time according to the temperature in the bonnet of the furnace.

Claims 1, 4, 6 and 9 of the Freeman patent are at issue, each of which covers a furnace heating system comprising separate elements assembled to constitute apparatus for controlling the supply of air through the furnace and the rate of fuel combustion. Claim 1 is the broadest claim at issue, and reads as follows:

> "In a furnace control, the combination of
> apparatus for controlling
> the rate of combustion and
> the rate of supply of a heat-conducting medium,
> thermostatic apparatus responsive to furnace temperature, and
> connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to check combustion while supplying said medium when furnace temperature exceeds a predetermined degree."

The trial court correctly stated in Finding of Fact No. 27 (R. 1069):

> "The Freeman patent is not a patent on either the fan switch or the limit switch or both of them. It is a patent on a system of furnace control, which requires three thermostats for its operation."

Respondents expert witness, VanDeventer, testified as follows regarding the claims of the Freeman patent:

> "Mr. Moore: Q. You are familiar with all the claims, are you not, of the Freeman patent?
>
> "A: I am generally familiar with them.
>
> "Q. Can you point out in any one claim where this instrument which is accused to infringe the patent, or contribute to the infringement of the patent, is specified?
>
> "A. I do not think any of those claims specify any apparatus, Mr. Moore. They relate to a system, a furnace control system. I could carry out an infringement of those claims with any one of a large number of arrangements of those switches and instrumentalities." (R. 441.)

The thermostatic fan switch 23 and limit switch 24 are diagrammatically illustrated, and described as follows in the specification:

> "A pair of thermostatic switches 23 and 24 are located within the hood of the furnace." (Page 1, lines 50 and 51.)
>
> "The switch 23 is of a type which closes its circuit only when a predetermined temperature is exceeded." (Page 1, lines 88 to 90.)
>
> "The switch 24 is of the type which opens its circuit when a predetermined temperature has been exceeded." (Page 2, lines 6 to 8.)

The Freeman patent does not illustrate, describe, or suggest any controlling apparatus of the fan and limit circuits other than the two mechanically and operatively separate switches 23 and 24.

Neither petitioner nor respondent installs in furnaces the Freeman system for controlling the supply of air and the rate of combustion. They are competitors in supplying a single unitary structure, or separate structures, com-

prising thermostatic switches for separately controlling the fan and limit circuits. The acts of petitioner held to constitute contributory infringement of the Freeman patent are merely the making and selling of an unpatented unitary structure comprising thermostatically operated switches for separately controlling the fan and limit circuits.

Respondent is Monopolizing an Unpatented Thermostatic Control.

Respondent, through its operations under the Freeman patent, is endeavoring to monopolize an unpatented thermostatic switch adapted for use in controlling the fan and limit circuits in the heating system disclosed in the Freeman patent. Respondent has granted licenses under the Freeman patent to its following competitors (R. 11, 32):

Perfex Corporation,
Milwaukee, Wisconsin

Penn Electric Switch Co.,
Goshen, Indiana

White-Rodgers Electric Company,
St. Louis, Missouri

Cook Eectric Company,
Chicago, Illinois, and

Bendix Aviation Corporation,
South Bend, Indiana.

The licenses to all of these manufacturers of thermostatic switches and the license offered to petitioner, are substantially the same. A copy of the license granted to the Cook Electric Company was offered in evidence as Mercoid's Exhibit KK (R. 907). A copy of respondent's printed form of license under the Freeman patent is in

evidence (R. 895), as is also a copy of the license under the Freeman patent tendered by respondent to petitioner (R. 865).

An examination of the terms of said licenses clearly shows a purpose and intent on the part of respondent to monopolize under its Freeman patent for a system of furnace control, an unpatented thermostatic switching device.

Each of the licenses (Paragraph II, R. 908) grants a non-exclusive right and license under the Freeman patent to make, use and sell a "combination furnace control," which is defined in Paragraph I as follows (R. 907):

> "As used in this agreement, the expression 'Combination Furnace Control' shall mean a unitary structure including at least a switching means for controlling not less than two circuits and operated by temperature responsive means responsive to the temperature of a heating device or the fluid medium heated thereby, one of said circuits being established on temperature rise and another being established on temperature fall, the structure having permanent internal wiring connecting the switching means to terminals for the connection of external wires thereto, the internal wiring being so arranged that when the terminals are connected by external wires to a heat controlling mechanism or a combustion controlling mechanism for the heating device and to a means for controlling the circulation of the fluid medium heated thereby, such structure, when used as intended, embodies the system disclosed in and claimed by the Freeman Patent No. 1,813,732."

It will be noted that the "combination furnace control" is defined as "a unitary structure," and it is such unitary structure which the licensees are authorized to make and sell pursuant to their licenses under the Freeman patent for a furnace control system.

The following provisions in each license emphasize that it is limited to the sale of an unpatented device and not installation or use of the system of furnace control covered by the Freeman patent, and that the royalty exacted from the licensees is on the sale of the unpatented "combination furnace control" and not upon the installation or use of the unpatented system:

III. Royalties

"Licensee covenants and agrees to pay to Licensor an earned royalty of twenty-five cents (25¢) on each 'Combination Furnace Control' *sold by it.*" (R. 908.)

"V. Patent Marking

"Licensor and Licensee mutually agree that upon each of said 'Combination Furnace Controls' *sold* they will place a nameplate, or a securely fastened tag or a cover insert, which nameplate, or tag or cover insert shall carry upon it, among other things, the following information in clearly legible and reasonably sized lettering or printing:

"'Notice—This control is internally wired in a manner to shut down the heat source while permitting blower operation on furnace temperature rise and to stop the blower but permit operation of the heat source on temperature fall. *This control and its use carries with it a license for one installation employing the sequence of operation embodying the invention of Freeman Patent No. 1,813,732.*'"

"VI. Notice on Literature

"'*The Freeman Patent No. 1,813,732 covers systems of control* in which upon rise in the temperature of a furnace or like heating device, the source of heat is reduced or shut down but the blower or other circulating means is permitted to operate, and

in which upon fall in such temperature, the blower or other circulating device is stopped but the source of heat is permitted to heat the furnace or other heating device. *This control is specially designed for carrying out the system of the Freeman Patent and its use carries with it a license for one installation employing the sequence of operation of the Freeman Patent No. 1,813,732.*'"

. . . . . .

"VII. Price Condition

"(a) *The license granted herein to the Licensee is granted on the express condition that the prices*, terms and conditions of sale *of 'Combination Furnace Controls'* made in accordance with the terms of this agreement, shall be not more favorable to the customer than those fixed from time to time by Licensor for its own products embodying the invention covered by said agreement, and *Licensee agrees to maintain such not more favorable prices, terms and conditions of sale as to said 'Combination Furnace Controls.' The prices*, terms and conditions of sale shall be set forth in a schedule to be known as a 'Price Schedule' and shall be issued from time to time by Licensor and form a part of this Agreement as though herein set out in full, and *Licensee, after receiving a 'Price Schedule' agrees that it will sell 'Combination Furnace Controls' only at prices* and on terms not more favorable to the customer than those *set forth in said Price Schedule* and in compliance with the general sales rules in said Price Schedule. *A price schedule is hereto attached and marked 'Price Schedule Exhibit A.'*" (R. 909, 910.)

The royalty is payable when the "combination furnace control" *is sold*, without any limitation as to whether or not it is made use of in installing the Freeman system. The following statement of the Court of Appeals (R. 1229) therefore is inconsistent with the express terms of the licenses granted by respondent:

"* * * the record does not disclose any attempt on the part of Honeywell to collect a royalty on such control unless it is used or attempted to be used in a system which would infringe the Freeman combination."

The "Price Schedule Exhibit A," attached to each license, appears at R. 881 and R. 913. It specifies different minimum prices at which the licensees must sell the "combination furnace control" to manufacturers, to jobbers and wholesalers, and to dealers. Identical price schedules are attached to each of the licenses granted under the Freeman Patent (R. 47). Respondent was not content to authorize its licensees to make and sell and pay royalties on the "combination furnace control," which is not illustrated, described or suggested in the Freeman patent, but through a letter (R. 891) sent to each licensee (R. 887), respondent advised that if the licensee did not sell separate controls at a combined price less than 25% higher than the prices set forth in the price schedule of the "combination furnace control," respondent would not assert its rights under the Freeman patent on account of such sales. The said letter reads as follows:

"In connection with our license agreement to you under the Freeman Patent No. 1,813,732, we agree that so long as you do not sell separate heating medium temperature responsive controls for carrying out the system of the Freeman patent at a combined price which is less than 25% higher than the prices set forth in the Price Schedule of the agreement for any specific 'Combination Furnace Control' comparable to carrying out in operation and function what the separate controls would do, we will not assert our rights against you or your customers under the Freeman Patent on account of such sales." (R. 891.)

It seems quite obvious that while the use of separate structures or devices, diagrammatically disclosed in the Freeman patent, will be tolerated by respondent without royalty payments, provided the price which petitioner fixes is maintained, that the real use of the patent clearly is to establish a monopoly in the unitary structure defined as the "combination furnace control," which is not only not patented by, but is not even disclosed in, the Freeman patent.

The practice of respondent therefore is not merely to fix minimum prices on the "combination furnace control" on which the royalty of 25¢ is payable, but to fix the minimum prices at which the separate controls, such as indicated at 23 and 24 in the Freeman patent, can be sold by the licensees.

That the procedure of the respondent under its Freeman patent had primarily in view the maintenance of the same minimum selling prices by itself and its licensee-competitors, clearly appears from the following statement in its letter of June 21, 1940 (R. 923), to petitioner advising that an infringement suit would be filed against it, and "* * * that the necessity for our filing suit is the result of the necessity to be fair to our other licensees and to ourselves in this *present price situation.*"

Petitioner in its letter of June 28, 1940 (R. 925) to respondent, in giving reasons why it was unwilling to enter into the submitted license agreement under the Freeman patent stated:

> "* * * Also, under this license, Mercoid would agree to control the sale price of such Mercoid instruments, and this we have been advised is not in accordance with the law."

It is significant that although respondent had notified petitioner in 1932 (R. 791) of its alleged infringement of the Freeman patent, it was not until after January 1,

Patent Notice

Minneapolis-Honeywell Controls, Time-O-Stat Controls and Con-Tac-Tor Mercury Switch and National Regulator Controls are manufactured and sold under the following patents either own by Minneapolis-Honeywell Regulator Company or under which Minneapolis-Honeywell Regula Company is licensed. Other U.S. and foreign patents are pending:

Re 16,987	1,694,053	1,791,589	1,875,387	1,924,925	2,008,749	2,098,808	2,144,587	2,177
Re 16,140	1,694,107	1,792,101	1,875,388	1,925,455	2,008,776	2,099,087	2,145,146	2,178
Re 16,444	1,700,318	1,792,230	1,875,509	1,925,781	2,013,266	2,100,284	2,145,199	2,179
Re 17,983	1,703,534	1,795,149	1,875,510	1,926,680	2,017,368	2,101,548	2,145,791	2,179
Re 18,161	1,703,537	1,796,289	1,875,511	1,927,036	2,019,671	2,101,808	2,146,127	2,180
Re 18,503	1,704,008	1,796,511	1,875,589	1,927,046	2,019,945	2,102,324	2,146,604	2,180
Re 18,771	1,704,370	1,796,544	1,875,689	1,929,608	2,020,168	2,104,972	2,146,680	2,180
Re 19,091	1,704,371	1,800,412	1,876,044	1,931,238	2,021,607	2,105,686	2,146,681	2,180
Re 19,135	1,705,527	1,805,277	1,876,128	1,931,663	2,021,613	2,106,998	2,147,274	2,181
1,478,749	1,707,193	1,809,827	1,877,037	1,935,909	2,022,188	2,107,077	2,147,604	2,181
1,480,128	1,707,194	1,810,172	1,877,275	1,937,748	2,023,740	2,108,770	2,148,868	2,181
1,487,049*	1,707,195	1,813,732*	1,877,327	1,937,939	2,023,748	2,108,778	2,149,542	2,183
1,494,158	1,707,459	1,816,881	1,877,905	1,937	2,025,097	2,109,052	2,150,117	2,184
1,491,158	1,713,402	1,818,548	1,878,010	1,940	2,025,284	2,109,882	2,151,040	2,184
1,493,799	1,713,773	1,818,697	1,879,154	1,941,502	542	2,109,939	2,151,050	2,184
1,498,588	1,716,775	1,820,300	1,880,524	1,941,540	2,028,110	2,110,049	2,152,843	2,186
1,501,943	1,716,981	1,826,570	1,880,829	1,941,548	2,029,465	2,112,218	2,154,041	2,186
1,533,630	1,725,886	1,826,571	1,880,830	1,942,899	2,029,513	2,112,397	2,154,091	2,186
1,537,971	1,726,578	1,826,572	1,880,831	1,943,995	2,029,615	2,114,704	2,154,511	2,186
1,543,418	1,727,308	1,826,983	1,880,832	1,946,598	2,032,658	2,114,998	2,154,523	2,186
1,543,445	1,727,736	1,827,071	1,880,871	1,946,933	2,036,868	2,114,985	2,154,644	2,186
1,544,362	1,730,828	1,827,072	1,881,637	1,949,210	2,037,911	2,116,605	2,154,858	2,186
1,558,277	1,730,829	1,827,340	1,881,984	1,951,863	2,038,087	2,116,801	2,155,398	2,186
1,559,188	1,730,830	1,830,983	1,882,341	1,953,425	2,039,610	2,116,802	2,155,984	2,186
1,562,435	1,730,831	1,831,845	1,883,015	1,956,783	2,041,050	2,117,021	2,157,379	Des
1,566,474	1,732,174	1,832,462	1,883,146	1,957,085	2,041,363	2,117,514	2,158,019	Des
1,571,401	1,734,017	1,835,307	1,883,240	1,958,081	2,041,645	2,117,768	2,159,284	
1,572,668	1,736,127	1,835,974	1,883,241	1,958,093	2,041,821	2,118,505	2,159,503	
1,581,588	1,738,151	1,838,152	1,883,242	1,960,699	2,045,780	2,118,503	2,159,513	
1,585,629	1,738,190	1,839,630	1,883,243	1,961,252	2,046,162	2,119,944	2,159,617	
1,593,581	1,738,318	1,843,601	1,883,244	1,961,778	2,048,653	2,120,427	2,159,624	
1,598,674	1,744,169	1,844,936	1,883,245	1,961,802	2,052,538	2,120,803	2,159,951	
1,598,675	1,745,178	1,845,227	1,883,246	1,962,508	2,052,537	2,120,937	2,160,600	
1,598,676	1,748,640	1,847,033	1,883,247	1,962,620	2,052,918	2,120,938	2,160,042	
1,598,677	1,747,153	1,847,034	1,883,248	1,963,987	2,052,929	2,121,321	2,160,600	
1,599,173	1,748,828	1,847,095	1,883,957	1,966,108	2,052,947	2,122,687	2,161,248	Canadian
1,600,298	1,751,544	1,847,036	1,884,439	1,966,389	2,052,997	2,123,426	2,161,252	No
1,607,167	1,752,169	1,847,037	1,884,918	1,969,138	2,054,331	2,123,283	2,161,662	248
1,609,432	1,752,840	1,847,038	1,883,675	1,969,861	2,054,368	2,125,648	2,162,137	255
1,614,563	1,758,168*	1,847,880	1,889,284	1,969,987	2,055,033	2,126,182	2,166,802	285
1,620,808	1,758,147*	1,848,087	1,889,744	1,969,988	2,059,635	2,126,384	2,167,227	292
1,622,112	1,760,382	1,848,653	1,901,070	1,969,974	2,063,898	2,126,914	2,169,141	297
1,625,798	1,763,083	1,850,448	1,902,173	1,970,987	2,064,193	2,127,472	2,169,188	305
1,627,660	1,763,084	1,852,333	1,902,481	1,970,988	2,064,194	2,127,680	2,169,668	305
1,631,604	1,764,348	1,853,198	1,902,482	1,972,291	2,064,231	2,129,272	2,170,072	324
1,660,003	1,765,095	1,853,199	1,905,414	1,973,620	2,065,835	2,132,262	2,170,232	324
1,661,629	1,765,287	1,853,198	1,905,771	1,974,960	2,066,041	2,132,323	2,170,310	324
1,661,630	1,765,808	1,853,631	1,907,093	1,974,988	2,068,844	2,132,513	2,170,388	330
1,662,524	1,765,882	1,854,207	1,908,099	1,978,709	2,068,413	2,134,940	2,170,697	333
1,664,388	1,765,940	1,854,519	1,908,483	1,978,737	2,070,118	2,135,991	2,171,272	338
1,664,845	1,765,941	1,854,540	1,908,494	1,979,980	2,072,025	2,136,338	2,171,273	338
1,664,329	1,765,943	1,858,419	1,908,495	1,988,219	2,073,326	2,136,695	2,172,440	353
1,668,801	1,765,949	1,858,741	1,910,731	1,988,218	2,073,348	2,137,580	2,172,487	354
1,671,910	1,770,479	1,858,077	1,911,773	1,988,997	2,075,289	2,138,483	2,172,820	357
1,672,087	1,773,017	1,858,588	1,912,791	1,988,998	2,078,518	2,138,788	2,173,331	361
1,673,083	1,774,109	1,858,594	1,914,435	1,988,877	2,078,768	2,138,791	2,173,798	361
1,675,131	1,774,169	1,861,046	1,916,614	1,988,778	2,080,718	2,138,792	2,173,799	364
1,676,820	1,774,278	1,862,373	1,918,776	1,989,972	2,080,838	2,139,798	2,173,801	136
1,676,822	1,778,163	1,862,383	1,918,794	1,990,216	2,081,091	2,140,451	2,173,809	366
1,676,823	1,780,302	1,863,394	1,918,808	1,990,613	2,083,532	2,140,473	2,173,810	369
1,678,202	1,780,312	1,868,641	1,919,337	1,991,681	2,083,812	2,140,688	2,174,910	370
1,680,049	1,780,313	1,871,071	1,920,787	1,991,807	2,083,780	2,141,208	2,174,443	376
1,680,263	1,780,980	1,873,147	1,920,898	1,993,282	2,086,037	2,141,244	2,175,720	376
1,680,348	1,782,530	1,872,223	1,921,195	1,993,697	2,089,161	2,142,099	2,175,721	376
1,682,408	1,783,474	1,872,880	1,922,201	1,997,589	2,089,836	2,143,078	2,176,009	378
1,686,730	1,784,730	1,874,119	1,923,254	1,998,083	2,091,649	2,143,351	2,177,496	38
1,688,121	1,788,714*	1,874,317	1,924,304	2,000,700	2,094,992	2,143,356	2,177,598	384
1,690,881	1,797,700	1,874,611	1,924,608	2,003,924	2,098,323	2,143,569	2,177,597	388

*The right to use the Systems protected by the following patents is only granted to the user Minneapolis-Honeywell Regulator Company when the particular controls as shown below are pu chased from Minneapolis-Honeywell Regulator Company and used in the Systems:

Patent No.	SYSTEM	CONTROLS
1,487,049	Diaphragm Gas Valve System	Any Main Fuel Valve or Safety Pilot
1,788,168	System of maintaining Stober Fire	^Stoberswitches
1,788,167	System of maintaining Stober Fire	^Holdfire Controls
1,788,741	Humidifying System	Humidity Responsive Controls
1,813,732	Forced Air Furnace Control System	Furnace Fan Controls

^Trade Mark

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

1940, when Mercoid reduced its prices below those of respondent and its licensees for its combined furnace control for use in the Freeman system, that respondent instituted an infringement suit against petitioner on July 1st, 1940.

Respondent in its 1940 catalogue (Mercoid Exhibit T, R. 795) listed some six hundred patents either owned or controlled by it or under which it was licensed, followed by the statement that:

> **"The right to use the Systems protected by the following patents is only granted to the user by Minneapolis-Honeywell Regulator Company when the particular controls as shown below are purchased from Minneapolis-Honeywell Regulator Company and used in the Systems:"**

The foregoing statement was followed by a list of five system patents, including the Freeman patent in suit.

For convenient reference, page 40 (R. 795) of respondent's 1940 catalogue is here reproduced.

Patent No. 1,813,732 is the Freeman patent here in suit, and patent No. 1,758,146 is the Cross patent involved in *The Mercoid Corporation* v. *Mid-Continent Investment Co. and Minneapolis-Honeywell Regulator Co.*, Nos. 54 and 55, now pending before this Court on certiorari.

Respondent is using its patents for "Systems," comprising arrangements of old and unpatentable devices, to monopolize the unpatented devices used in the "Systems," and thereby limit competitors in their manufacture and sale of devices which they have commercialized from dates long prior to the dates of the "Systems." If the method of exploiting its "System" patents practiced by respondent is upheld as legal, all manufacturers of unpatented parts, such as thermostatic controls, which may be com-

prised in the patented "Systems," will have to further restrict their manufacture and sale of such controls each time an additional "System" patent is granted, and the public will have to discontinue obtaining controls from their usual sources and obtain them only from the sources designated by the owners of such additional "System" patents.

The foregoing acts of the respondent evinces a consistent effort to monopolize under the Freeman patent for a domestic heating system, an unpatented thermostatic control, and to derive its sole revenue under the patent, not through the alleged invention which it covers, but through an unpatented part capable of being used with other parts in installing the patented system, and a determined attempt to prevent competition in the manufacture and sale of an unpatented thermostatic control.

Improper Use of Freeman Patent Precludes Maintenance of Suit by Respondent.

Neither respondent nor petitioner, nor any of respondent's licensees, install the system of furnace control disclosed in the Freeman patent. They sell thermostatic controls, or as the licenses term them, "combination furnace controls," capable of being used in installing the Freeman system.

The terms of the licenses granted and tendered by respondent; the notice in its 1940 catalogue that thermostatic controls for use in the Freeman heating system must be purchased from respondent, and the institution of this suit to prevent petitioner from competing in the manufacture and sale of an unpatented thermostatic control adapted for use in lieu of separate controls such as indicated at 23 and 24 of the Freeman patent, all clearly prove that respondent has used, and is using, the Freeman pat-

ent for a system of furnace control to monopolize an unpatented thermostatic control.

That the owner of a patent may not maintain a suit for infringement when its operations under the patent are such as to so expand the monopoly as to control unpatented articles, has been repeatedly held by this Court and Circuit Courts of Appeals.

This Court in *Carbice v. American Patents Corp.*, 283 U. S. 27, had before it a suit for contributory infringement of a patent covering a transportation package comprising a carton within which is placed ice cream or other food stuff to be shipped, and a quantity of solid carbon dioxide. This Court said:

> "*The sole business of the Dry Ice Corporation is the manufacture of solid carbon dioxide which it sells under the name of 'Drylce.' It does not make or sell transportation packages in which solid carbon dioxide is used as a refrigerant.* It does not issue to other concerns licenses to make such packages upon payment of a stipulated royalty. It does not formally license buyers of its dry ice to use the invention in suit." (pp. 29, 30.)

Each invoice for solid carbon dioxide bore a notice from which it was assumed that the Dry Ice Corporation extended to each of its customers who bought solid carbon dioxide, a license to use the patented invention without the payment of royalty (283 U. S. 30).

The defendant, Carbice Corporation, also manufactured solid carbon dioxide, and was charged with contributory infringement because it sold its product to customers of the Dry Ice Corporation with knowledge that the dioxide was to be used by the purchaser in transportation packages like those described in the patent.

This Court said regarding the plaintiff:

> "But it may not exact as the condition of a license that *unpatented materials used in connection with the invention shall be purchased only from the licensor;* and *if it does so, relief against one who supplies such unpatented materials will be denied.*" (p. 31.)
>
> • • • • • •
>
> **"The Dry Ice Corporation has no right to be free from competition in the sale of solid carbon dioxide. Control over the supply of such unpatented material is beyond the scope of the patentee's monopoly; and this limitation, inherent in the patent grant, is not dependant upon the peculiar function or character of the unpatented material or on the way in which it is used. Relief is denied because the Dry Ice Corporation is attempting, without sanction of law, to employ the patent to secure a limited monopoly of unpatented material used in applying the invention. The present attempt is analogous to the use of a patent as an instrument for restraining commerce which was condemned, under the Sherman Anti-Trust Law, in Standard Sanitary Mfg. Co. v. United States, 226 U. S. 20."** (pp. 33 and 34.)

It is interesting to note that the unpatented refrigerant, the sale of which by the defendant was charged to constitute a contributory infringement of the patent, was:

> "one of the necessary elements of the patented product." (p. 33.)

It is also interesting to note that the defendant in selling the dioxide did so knowing that it was:

> "to be used by the purchaser in transportation packages like those described in the patent." (p. 30.)

This Court in *Leitch Mfg. Co.* v. *Barber Co.*, 302 U. S. 458, followed its decision in the *Carbice* case, and held that the plaintiff was not entitled to relief because of its improper use of its patent. This Court said:

> "The Barber Company brought, in the federal court for New Jersey, against the Leitch Manufacturing

Company, this suit to enjoin the alleged contributory infringement of patent No. 1,684,671, dated September 18, 1928, by selling and delivering bituminous emulsion to a road builder, *knowing that it was to be used in Newark in accordance with the method defined in the claims of the patent.*" (pp. 459, 460.)

This Court said regarding the plaintiff:

"The company does not itself engage in road building, or compete with road contractors. It does not seek to make road builders pay a royalty for employing the patented method. It does not grant to road builders a written license to use the process. But it adopts a method of doing the business which is the practical equivalent of granting a written license with a condition that the patented method may be practiced only with emulsion purchased from it. For any road builder can buy emulsion from it for that purpose, and whenever such a sale is made, the law implies authority to practice the invention. On the other hand The Barber Company sues as contributory infringer a competing manufacturer of this unpatented material who sells it to a road builder for such use. Thus, the sole purpose to which the patent is put is thereby to suppress competition in the production and sale of staple unpatented material for this use in road building."

* * * * * *

"That the patent did not confer upon The Barber Company the right to be free from competition in supplying unpatented material to be used in practicing the invention was settled by the rule declared in the *Carbice* case." (pp. 460, 461.)

This Court, after quoting from its decision in the *Carbice* case, said:

"It denied relief, not because there was a contract or notice held to be inoperative, but on the broad ground that the owner of the patent monopoly, ignor-

ing the limitation 'inherent in the patent grant,' sought by its method of doing business to extend the monopoly to unpatented material used in practicing the invention. **By the rule there declared every use of a patent as a means of obtaining a limited monopoly of unpatented material is prohibited. It applies whether the patent be for a machine, a product, or a process. It applies whatever the nature of the device by which the owner of the patent seeks to effect such unauthorized extension of the monopoly. Nothing in Leeds & Catlin Co. v. Victor Talking Machine Co., 213 U. S. 325, limits it.**" (p. 463.)

In *Morton Salt Co.* v. *Suppiger Co.*, 314 U. S. 488, this Court also held that the plaintiff was not entitled to relief because it was using its patent on a machine for depositing salt tablets, to monopolize the unpatented salt tablets. This Court said:

"The principal business of respondent's subsidiary, from which its profits are derived, is the sale of salt tablets. In connection with this business, and as an adjunct to it, respondent leases its patented machines to commercial canners, some two hundred in all, under licenses to use the machines upon condition and with the agreement of the licensees that only the subsidiary's salt tablets be used with the leased machine.

"It thus appears that respondent is making use of its patent monopoly to restrain competition in the marketing of unpatented articles, salt tablets, for use with the patented machines, and is aiding in the creation of a limited monopoly in the tablets not within that granted by the patent. A patent operates to create and grant to the patentee an exclusive right to make, use and vend the particular device described and claimed in the patent. But a patent affords no immunity for a monopoly not within the grant, *Interstate Circuit* v. *United States*, 306 U. S. 208, 228, 230; *Ethyl Gasoline Corp.* v. *United States*, 309 U. S. 436, 456, and the use of it to suppress competition in the

sale of an unpatented article may deprive the patentee of the aid of a court of equity to restrain an alleged infringement by one who is a competitor." (p. 491.)

"It is unnecessary to decide whether respondent has violated the Clayton Act, for we conclude that in any event the maintenance of the present suit to restrain petitioner's manufacture or sale of the alleged infringing machines is contrary to public policy and that the district court rightly dismissed the complaint for want of equity." (p. 494.)

On the same day that it decided the *Morton Salt* case, this Court delivered its opinion in *B. B. Chemical Co.* v. *Ellis*, 314 U. S. 495, and said:

"*This is a companion case to Morton Salt Co.* v. *Suppiger*, *ante*, *p.* 488, *and involves the question whether the owner of a method patent who authorizes manufacturers to use it only with materials furnished by him may enjoin infringement by one who supplies the manufacturer with materials for use by the patented method and aids in such use.*" (pp. 495 and 496.)

"The courts below held that petitioner's sale to manufacturers of the unpatented materials for use by the patented method operated as a license to use the patent with that material alone and thus restrained competition with petitioner in the sale of the unpatented material, as in *Carbice Corp.* v. *American Patents Corp.*, 283 U. S. 27, and *Leitch Mfg. Co.* v. *Barber Co.*, 302 U. S. 458.

"Petitioner insists that the respondents' acts of infringement, as found by the district court, were not limited to the sale of material for use by the patented method, as in the *Carbice* and *Leitch* cases, but amounted to active inducement of infringement by the shoe manufacturers and to cooperation with their infringing acts. Petitioner argues that, even though under the *Carbice* and *Leitch* cases it has 'no right to

be free from competition in the sale of the materials, it has the right under the patent law to restrain infringement in any manner other than by the competitive sale of the unpatented materials.

"*We may assume, for purposes of decision, that respondents' infringement did extend beyond the mere sale of the materials to the manufacturers. But in view of petitioner's use of the patent as the means of establishing a limited monopoly in its unpatented materials, and for the reasons given in our opinion in the Morton Salt Company case, we hold that the maintenance of this suit to restrain any form of infringement is contrary to public policy, and that the district court rightly dismissed it.*" (pp. 497 and 498.)

The decisions of this Court in the *Carbice* and *Leitch* cases have been followed by the Courts of Appeals in the First Circuit in *J. C. Ferguson* v. *American Lecithin Co.*, 94 F. (2d) 729; in the Second Circuit in *The Philad Co.* v. *Lechler Laboratories*, 107 F. (2d) 747; in the Third Circuit in *Barber Asphalt Co.* v. *La Fera Grecco*, 116 F. (2d) 211; in the Fourth Circuit in *Sylvania* v. *Visking*, 132 F. (2d) 947; in the Fifth Circuit in *Noradel-Agene* v. *Penn*, 119 F. (2d) 764; in the Sixth Circuit in *Barber-Colman Co.* v. *National Tool Co.*, 58 U. S. P. Q. 2, and in the Seventh Circuit in *American Lecithin Co.* v. *Warfield Co.*, 105 F. (2d) 207.

The Court of Appeals in the instant case in its opinion stated:

"In support of its contention to the contrary, Mercoid relies upon *Carbice Corp.* v. *American Patents Corp.*, 283 U. S. 27, and *Leitch* v. *Barber*, 302 U. S. 458, and kindred cases. In the *Carbice* case, the Supreme Court said that it was wholly unlike the *Leeds & Catlin* case, and in the *Leitch* case, the Court said that there was nothing in the *Leeds & Catlin* case that limited the rule in the *Carbice* case. Other cases upon which Mercoid relies are *Motion Picture Patents Co.* v. *Uni-*

versal Film Co., 243 U. S. 502; *Morton Salt Co.* v. *Suppiger Co., supra; B. B. Chemical Co.* v. *Ellis*, 314 U. S. 495; *American Lecithin Co.* v. *Warfield Co.*; 105 F. 2d 207; and *Philad Co.* v. *Lechler Laboratories*, 107 F. 2d 747. In all these cases the objectionable conduct was directed toward the sale of something which was not the advance in the art and did not necessarily measure or mark the use covered by the patent." (R. 1230-1.)

It is submitted on behalf of the petitioner that the Circuit Court of Appeals was in error in its understanding of the decisions of this Court, and inconsistent with the interpretation and application by other Circuit Courts of Appeals of the said decisions of this Court.

The Court of Appeals for the Second Circuit in *The Philad Co.* v. *Lechler Laboratories*, 107 F. (2d) 747, 748 and 749, stated:

"The Philad Company, owner of a patent on a process for imparting a permanent wave to the hair, patent to Mayer, reissue 18,841, brought suits for infringement against four concerns. * * * *The defendants conceded that the appliances sold by them (clamps, curling rods, pads and heaters) were of shapes and sizes that fitted them for use in operating the patented process and were sold with knowledge that customers would use them in waving hair by that process.* The trial judge dismissed the complaints without passing on the validity of the patent. He held that the Philad Company was attempting to use the process patent to control unpatented materials and was consequently not entitled to relief.

"The Philad Company does not use the patented process, nor does it collect royalties from hair dressers for use of the process. What it does do is to issue licenses to some sixteen concerns which manufacture hair waving equipment, with authority to sublicense the process to purchasers of equipment. * * * The manufacturing concerns sell the equipment to hair

dressers, in effect sublicensing them to use the patented process with the equipment. The defendants are competitors of the licensed manufacturers in the sale of hair dressing apparatus. As already stated, their apparatus is suitable for use in carrying on the patented process and is in fact so used, to the knowledge of the defendants. The apparatus, however, is not within the patent sued on. * * *

"The patent sought to be enforced is on a process of waving hair. It does not give the plaintiff a monopoly in the appliances by which the process is operated. *Yet the plaintiff's course of conduct shows plainly that the sole use made of the patent is to suppress competition in the appliances. It is not entitled to relief against those who sell such appliances without its leave.* * *

"*In both the Carbice case and the Leitch case the emphasis was on the fact that the articles handled by the alleged contributory infringers were not covered by the patent, and on the further fact that the patentee by his method of doing business was using his patent as if it did cover such articles * * * for present purposes the appliances are to be taken as unpatented.*"

The said holding of the Circuit Court of Appeals in the case at bar is also in direct conflict with the judgment of the Circuit Court of Appeals for the Third Circuit in *Barber Asphalt Corp. et al.* v. *La Fera Grecco Contracting Co.*, 116 F. (2d) 211, 215, 216, wherein the court stated:

"The principle enunciated by the Supreme Court in *Carbice Corp.* v. *American Patents Corp., supra* is exceedingly explicit. It holds that the owner of a patent for process may not secure a partial monopoly on the unpatented material employed in it. This is precisely the effect of the agreements and licensing plans of the plaintiffs. Accordingly the court below erred in holding that the course pursued by the plaintiffs did not create an unlawful monopoly in the sale of unpatented staple materials, viz., bituminous emulsions."

Furthermore, the Circuit Court of Appeals, speaking through Judge Sparks, in the case at bar in reversing the District Court's ruling that "Minneapolis-Honeywell has been so using its patent as to tend to create a monopoly in an unpatented device," and is not in a position to maintain this suit, is in direct conflict with its own judgment in the *American Lecithin* case, 105 F. (2d) 207, 212, certiorari denied 308 U. S. 609, wherein, speaking through Judge Kerner, it held:

> "*Thus, in the instant case, it is obvious that the sole protection sought by the patentee was of a limited monopoly for its unpatented lecithin. It did not try to obtain any income from the monopoly expressly granted by the patent itself, either by practicing the patented method or by granting licenses for a royalty. For this reason, a different light is shed upon the rights of the patentee, and for this reason relief is denied the patentee. * * * The plaintiff's method of doing business had only one purpose, the doing by indirection what was prohibited directly, i.e., the securing of a monopoly in the sale of lecithin, a commodity not coming within the boundaries of the patent owned by the plaintiff. This action the courts will not sanction.*
>
> "We conclude, therefore, that the plaintiff's attempt to extend its patent monopoly beyond the boundaries described in the claims of the patent is condemned under the law. For this reason relief to the plaintiff is denied, and the decree of the district court is affirmed."

The said holding of the Circuit Court of Appeals in the case at bar is also in direct conflict with a later judgment of the Circuit Court of Appeals for the Fourth Circuit in *Sylvania Industrial Corporation* v. *The Visking Corporation*, 132 F. (2d) 947, 955, wherein the Court stated:

> "*The court found from these facts* that the plaintiff was making use of patents owned by it, including the patents in suit, for the purpose of securing a lim-

ted monopoly of an unpatented material, that is, plain, unprinted, regenerated cellulose sausage casings, and concluded, therefore, *that the plaintiff was not entitled to relief* in this suit even though, as the court held, the patents in suit were valid and infringed by the defendant. *This legal conclusion is in accordance with the doctrine that the use of the patent monopoly to restrain competition in unpatented material is contrary to the public policy expressed in the Constitution and laws of the United States to promote the progress of science and useful arts by securing to inventors the exclusive right to their inventions for limited times. In Morton Salt Co. v. Suppiger Co.*, 314 *U. S.* 488, 491, 492, *the court said*:

> "* * * *It is a principle of general application that courts, and especially courts of equity, may appropriately withhold their aid where the plaintiff is using the right asserted contrary to the public interest.*"

It is submitted by petitioner that in view of the foregoing authorities, respondent has so used its Freeman patent as to disentitle it to relief.

Respondent Has Violated Anti-Trust Laws.

The respondent has used its Freeman patent to prevent competition in the manufacture and sale of unpatented thermostatic controls capable of use for controlling the electric circuits of the fan and fuel combustion apparatus in the system disclosed in the Freeman patent, and also through its license agreements with competitors, has fixed the minimum prices at which the said unpatented thermostatic controls must be sold. Petitioner therefore has violated the Anti-Trust laws.

Respondent in its catalogue of 1940 (R. 795), after listing some six hundred patents, notified the public regarding five "System" patents, including the Freeman patent in suit No. 1,813,732, as follows:

> **"The right to use the Systems protected by the following patents is only granted to the user by Minneapolis-Honeywell Regulator Company when the particular controls as shown below are purchased from Minneapolis-Honeywell Regulator Company and used in the Systems."**

Petitioner in its licenses under the Freeman patent not only fixes the minimum selling prices on the so-called "combination furnace control," which is adapted for use in lieu of the separate thermostatic switches indicated at 23 and 24 in the Freeman patent, but also controls the prices at which licensees must sell separate controls (R. 891).

That the acts of respondents violate the Anti-Trust laws is supported by the following authorities:

This Court in 1922 in *United Shoe Machinery Corp. v. U. S.*, 258 U. S. 451; held that a contract, which provided that the lessee should purchase supplies exclusively from the lessor, violated the Anti-Trust laws.

This Court in the *Carbice* case, 283 U. S. 27, 34, in support of its statement that:

> "The present attempt is analogous to the use of a patent as an instrument for restraining commerce which was condemned, under the Sherman Anti-Trust Law, in *Standard Sanitary Mfg. Co.* v. *United States*, 226 U. S. 20,"

inserted the following note:

> "In such cases, the attempt to use the patent unreasonably to restrain commerce is not only beyond the scope of the grant, but also a direct violation of the Anti-Trust Acts. Compare § 3 of the Clayton Act, October 15, 1914, c. 323, 38 Stat. 730, 731, which prohibits any lease, sale, contract, or agreement tending to create a monopoly in any line of commerce, and is applicable to all 'goods, wares, merchandise, machinery, supplies or other commodities, whether patented

or unpatented. * * *" See *United Shoe Mach. Co.* v. *United States*, 258 U. S. 451, 460; *Lord* v. *Radio Corp. of America*, 24 F. (2d) 565, 566-67, affirmed, 28 F. (2d) 257, certiorari denied, 278 U. S. 648, decree entered, 35 F. (2d) 962, affirmed, 47 F. (2d) 606. Compare, as to trade secrets, *Dr. Miles Medical Co.* v. *Park & Sons Co.*, 220 U. S. 373, 401."

This Court in its recent decision in *Ethyl Gasoline Corp.* v. *U. S.*, 309 U. S. 436, 456, in holding violation of the Anti-Trust Acts said regarding a patentee:

> "He may not, by virtue of his patent, condition his license so as to tie to the use of the patented device or process the use of other devices, processes or materials which lie outside of the monopoly of the patent licensed; *Motion Picture Patents Co.* v. *Universal Film Mfg. Co., supra; Carbice Corporation* v. *American Patents Corp.*, 283 U. S. 27, 31; *Leitch Manufacturing Co.* v. *Barber Co.*, 302 U. S. 458; cf. *United Shoe Machinery Co.* v. *United States*, 258 U. S. 451, 462; *International Business Machines Corp.* v. *United States*, 298 U. S. 131, 140; * * *"

The holding of the Circuit Court of Appeals in the case at bar that the respondents have not violated the Anti-Trust laws is in direct conflict with the judgment of the Court of Appeals for the Third Circuit in *Radio Corporation of America* v. *Lord*, 28 F. (2d) 257, certiorari denied 278 U. S. 648, in which Lord *et al.* alleged that the R.C.A. had violated U. S. C., Title 15, Paragraphs 1, 2 and 14, by granting licenses to make and use its radio receiving sets only when vacuum tubes were purchased from R.C.A. The Court of Appeals affirmed the findings of the District Court that the effect of the license was to substantially lessen competition and tend to create a monopoly in violation of the Anti-Trust laws.

This Court in *Morton Salt Co.* v. *Suppiger*, 314 U. S. 488, 490, said:

> "The Clayton Act authorizes those injured by violations tending to monopoly to maintain suit for treble damages and for an injunction in appropriate cases. 15 U. S. C. §§ 1, 2, 14, 15, 26."

That respondent violates the Anti-Trust laws in fixing the minimum prices at which the unpatented "combination furnace controls" must be sold by its licensees, is supported by a recent decision of this Court in *Solo Electric Co.* v. *Jefferson Electric Co.*, 317 U. S. 173, from which the following statement is quoted:

> "The present license contract contemplates and requires that petitioner, on sales of the licensed transformers throughout the United States, shall conform to the prices fixed by respondent for the sale of competing patented articles by other licensees and by respondent. Such a restriction on the price of articles entering interstate commerce is a violation of the Sherman Act save only as it is within the protection of a lawfully granted patent monopoly. See *United States* v. *Univis Lens Co.*, 316 U. S. 241, 250, and cases cited; *United States* v. *Masonite Corp.*, 316 U. S. 265, 275-77. *Agreements fixing the competitive sales price of articles moving interstate, not within the protection of a patent, are unlawful because prohibited by the Sherman Act.*"

The District Court found that "the Freeman patent is not a patent on either the fan switch or limit switch, or both of them," but is "a patent on a system of furnace control" (R. 1069). Hence the foregoing statement of this Court is particularly pertinent as the respondent's method of doing business under the Freeman patent involves primarily the fixing of prices on the unpatented "combination furnace control," which comprises the fan and limit switches.

The conditions contained in the licenses granted by respondent fixing selling prices on the unpatented "combination furnace controls," as well as on the unpatented separate fan and limit controls; the conditioning of licenses under the Freeman patent upon the purchase from respondent of the unpatented control, and the institution of this suit against petitioner, a competitor of respondent in manufacturing and selling the unpatented thermostatic control, all conclusively evince a studied and persistently followed plan by respondent "to substantially lessen competition or tend to create monopoly in any line of commerce" (Sec. 3, Clayton Act).

Contributory Infringement.

The sole acts of petitioner held to constitute a contributory infringement of the Freeman patent are the manufacture and sale of an unpatented thermostatic control for use in lieu of separate switches, indicated at 23 and 24 in the Freeman patent, in the system of furnace control disclosed in the Freeman patent.

The petitioner and its predecessor, Federal Gauge Co., since at least 1925 have included in their business the manufacture and sale of thermostatic electric switches, including room thermostats, such as indicated at 18 in the Freeman patent, and switches, such as indicated at 23 and 24 in the Freeman patent, to serve as a limit control to prevent excessive generation of heat in a furnace, and for controlling the operation of a fan according to the temperature in the furnace.

Mr. Black, who has been associated with the petitioner since 1925, testified as follows:

> "Q. What was the business of the Federal Gauge Company in 1925?
>
> "A. They were engaged in the business of supplying the heating industry with thermostatic and pres-

sure-responsive electric switches, and to name a few I would say they sold in those days devices of the kind defined in the Freeman patent and indicated at 18, room thermostats. They also sold in those days, that is, 1925 and prior thereto, thermostatic devices of the kind defined in the Freeman patent as 23 and 24, those devices being sold for the purpose of serving, 24, a limit control, to prevent excessive temperature in the furnace and also as a fan control to delay the operation of the fan until the furnace was heated.

"Q. Does the Mercoid Corporation at the present time continue to manufacture and sell such controls?

"A. Yes sir, they do." (R. 141.)

Petitioner designed its M-80 control in order to embody in a unitary structure mechanism for thermostatically controlling two separate circuits for use as a more efficient means for controlling the fan and limit switches than structurally separate thermostatic switches for each of the circuits such as its M-51 and M-53. In selling the M-80 control, petitioner also continues to sell the structurally separate thermostatic switches, M-51 and M-53. The separate switches have been sold since 1925, their identity then being the type Figure 50, serving as a limit control, and the Figure 50 with tube reversed as the fan control, as distinguished from the types M-51 and M-53 respectively, as of today (R. 805, 813, 833, 835 and 945). The petitioner sells today for use in the Freeman system the separate controls side by side with the combination M-80 control, but the licenses under the Freeman patent require royalties only in combination controls. The Circuit Court of Appeals in the instant case held that the unpatented thermostatic control M-80 supplied by petitioner was especially adapted for use in practicing the Freeman furnace control system, and that petitioner therefore is a contributory infringer. The Circuit Court of Appeals said:

> "The accused device has no other use than for accomplishing the sequence of operations of the Freeman patent." (R. 1228.)

Petitioner has sold since 1925, and is still selling (R. 141), separate controls which were, and still are, used as limit and fan switches (such as 23 and 24 of the Freeman patent) in heating systems. Respondent has asserted (R. 791 and 891) that the use of such separate switches involves the Freeman patent, and also asserts that the use of petitioner's unitary combination control M-80 is the equivalent of the separate switches 23 and 24 of the Freeman patent. As the separate limit and fan switches were, and still are, used for other purposes than in the Freeman system, the combination control M-80, which respondent asserts is the equivalent of the separate fan and limit switches disclosed in the Freeman patent, can equally well be used for other purposes than in the Freeman system.

The Court of Appeals in giving weight to its erroneous holding that petitioner's M-80 control has no other use than accomplishing the sequence of operations of the Freeman patent, and in adjudging that petitioner has contributorily infringed the Freeman patent, gave to the decisions of this Court in the *Carbice* and *Leitch* cases unwarranted limitations. In said decisions holding that defendants were not liable as contributory infringers the materials supplied by the defendants were ordinary commodities, rather than a material or part particularly adapted for use in practicing the patented invention. The controlling consideration obviously was that the material or part supplied by defendants for use in practicing the patented inventions, was *unpatented*. In the *Carbice* decision, this Court said:

> "The Carbice Corporation also manufactures solid carbon dioxide. It is charged with contributory infringement because it sells its product to customers

of the Dry Ice Corporation with knowledge that the dioxide is to be used by the purchaser in transportation packages like those described in the patent.". (p. 30.)

* * * * * *

"Control over the supply of such unpatented material is beyond the scope of the patentee's monopoly; and this limitation, inherent in the patent grant, is not dependent upon the peculiar function or character of the unpatented material or on the way in which it is used." (p. 33.)

In the *Leitch* case, this Court quoted from its opinion in the *Carbice* case, and stated relative thereto:

"It denied relief, not because there was a contract or notice held to be inoperative, but on the broad ground that the owner of the patent monopoly, ignoring the limitation 'inherent in the patent grant,' sought by its method of doing business to extend the monopoly to unpatented material used in practicing the invention. *By the rule there declared every use of a patent as a means of obtaining a limited monopoly of unpatented material is prohibited. It applies whether the patent be for a machine, a product, or a process. It applies whatever the nature of the device by which the owner of the patent seeks to effect such unauthorized extension of the monopoly.* Nothing in *Leeds & Catlin Co.* v. *Victor Talking Machine Co.*, 213 U. S. 325, limits it." (p. 463.)

That the decisions of this Court in the *Carbice* and *Leitch* cases were not limited in principle to the sale by alleged contributors of ordinary articles of commerce, as distinguished from unpatented material generally, has been held by several Circuit Courts of Appeals. The Court of Appeals for the Second Circuit in *Philad Co.* v. *Lechler Laboratories, Inc.*, 107 F. (2d) 747, 748, stated regarding the said decisions of this Court:

"It is urged that the rule of the *Carbice* case covers only an effort of a patentee to control the use of staple materials, carbon dioxide in the *Carbice* case, bituminous emulsion in the *Leitch* case, and that the hair waving devices in the present case are not staples. There is no support for any such limitation on the rule. In both the *Carbice* case and the *Leitch* case the emphasis was on the fact that the articles handled by the alleged contributory infringers were not covered by the patent."

The Court of Appeals for the First Circuit in *B. B. Chemical Co.* v. *Ellis*, 117 F. (2d) 829, 834, reviewed the rule established by the decisions of this Court in the *Carbice* and *Leitch* cases, and said:

> *"The plaintiff seeks to prevent the application of this rule to this case by limiting the doctrine to those situations in which the alleged contributory infringer supplies staple articles of commerce. It insists that where the articles supplied are specially manufactured for use in this particular process, relief is not to be denied the patentee no matter what his course of business. It points to dry ice, bituminous emulsion, and lecithin as such staple articles. * * * We do not consider that to have been intended as a limitation upon the doctrine of the Leitch and Carbice cases. The language of those cases is extremely comprehensive and is by no means restricted to staple articles. * * * There is every indication that the Carbice and Leitch cases apply to specially designed non-patented articles. (Citing authorities.) We agree with the opinion of the Second Circuit in Philad Co. v. Lechler Laboratories, supra, that the emphasis is on the fact that the articles sold by the alleged contributory infringers were not covered by the plaintiff's patent although it conducted its business as though they were."*

A consideration of the decision of this Court in *Leeds & Catlin Co.* v. *Victor*, 213 U. S. 301, 325, relied upon by

the Court of Appeals in holding contributory infringement, clearly shows that the facts there involved are very different from those presented in the case at bar, and affords no support for the decision of the Court of Appeals.

Petitioner learned nothing from the Freeman patent as to the thermostatic controls which it supplies for use by its customers in installing the Freeman hot air heating system.

The incorporation by petitioner in a unitary structure, the M-80, the structures of the separate limit and fan controls in use since 1925, and in particular the 1929 types M-51 and M-53 (R. 823, 837), created an improved control, housing in one case the limit and fan switches, and actuating them by a single bi-metallic coil.

Thermostatic controls 23 and 24 are merely diagrammatically shown in the patent. This is a fact radically different from those involved in the *Leeds & Catlin* case where the contributory infringement consisted in making and selling the disc record specifically disclosed in the Berliner patent and having the structural characteristics therein described, for cooperating with the stylus of the talking machine to vibrate it laterally and at the same time move it radially of the record.

This Court in *Bassick Mfg. Co.* v. *Hollingshead Co.*, and *Rogers et al.* v. *Alemite Corp.*, 298 U. S. 415, 425, said regarding its decision in the *Leeds & Catlin* case:

> "*Leeds & C. Co.* v. *Victor Talking Machine Co.*, 213 U. S. 301, 325, 53 L. Ed. 805, 815, 29 S. Ct. 495, on which the respondent relies, is not in point. There the patent was a *pioneer patent* and the combination was of *elements* which *were novel and neither of which possessed utility without the other*. Each element was necessary to the operation of the other. The invention did not, as here, consist of the mere improvement of one element of an old combination."

This Court in *Lincoln Engineering Co.* v. *Stewart-Warner Corp.*, 303 U. S. 545, 552, again commented on its decision in the *Leeds & Catlin* case as follows:

> "Berliner disclosed an *entirely novel principle;* he utilized the flat disc having a smooth bottomed groove with spiral waves in its sides not only to agitate the needle connected to the diaphragm, but, in combination with a swinging arm, to propel the needle lengthwise the groove. In *his combination, the disc not only performed a new function* but *performed it in combination with another new element*,—the *swinging arm which carried the needle.*"

It therefore is submitted that the later decisions of this Court hereinabove referred to are controlling in the case at bar, rather than the earlier decision in the *Leeds & Catlin* case, in which the facts were strikingly different from those in the case at bar and those involved in the more recent decisions of this Court hereinabove referred to.

The Court of Appeals in the instant case in considering as a factor in determining contributory infringement that petitioner's M-80 thermostatic switching device had no other use than in the Freeman system, is at variance with the decisions of this Court in the *Carbice* and *Leitch* cases, and directly contrary to the interpretation given to the said decisions of this Court by the Courts of Appeals for the First and Second Circuits.

While many decisions favorable to defendants charged with contributory infringement of patents have been primarily based upon the improper use of their patents by the plaintiffs, yet some of them have clearly held that one who furnishes an unpatented part knowing it will be used by the purchaser in connection with other parts to infringe a patent, is not legally a contributory infringer of the patent.

The Court of Appeals for the Second Circuit in *Philad* v. *Lechler*, 107 F. (2d) 747, 748, stated with reference to the decisions of this Court in *Carbice* v. *American*, 283 U. S. 27, and *Leitch* v. *Barber*, 302 U. S. 458:

> "*Obviously these decisions present an important limitation on the doctrine of contributory infringement as formerly understood.* * * * On contributory infringement the distinction at present is between the case where an owner of a patent exploits it in the ordinary manner and the case where he employs it primarily as a means of suppressing competition in unpatented materials used in connection with it. The present cases are obviously of the latter type."

The Court of Appeals for the First Circuit in *J. C. Ferguson Co.* v. *American Lecithin Co.*, 94 F. (2d) 729, 731, reviewed the decision of this Court in the *Carbice* and *Leitch* cases, and said:

> "The plaintiff does not issue licenses under the Working patent; it sells lecithin and it notifies users of lecithin that if they use in candymaking lecithin bought elsewhere they will be sued for infringement of the patent. The defendant deals inter alia in lecithin. It sells it to manufacturers of candy knowing they intend to use it in making chocolate candy. In order to prevent such sales the present suit for contributory infringement was brought. The purpose of the suit is to establish a monopoly by the plaintiff in the sale of lecithin for use in the products and the process described in the patent."
>
> * * * * * *
>
> "*Under the law as it now stands it seems clear that a patent on a process, a product, or a 'composition of matter,' may not be extended, under the doctrine of contributory infringement, to monopolize the sale of unpatented staple material, used in such product, process, or composition. Broad expressions as to contributory infringement used in earlier cases relied on by the plaintiff must now be read with the Carbice and Leitch cases in mind.*"

In both the *Carbice* and the *Leitch* cases the defendants were charged with contributory infringement of the patents in those suits by reason of their sale of unpatented materials for use by the purchasers in infringing the patented inventions. This Court in both of said cases reversed the judgments of the lower courts that the defendants had been guilty of contributory infringement.

There is obviously no more effective way to monopolize an unpatented part or device than to sue as contributory infringers competitors who supply such unpatented materials.

Irrespective of whether a patent owner cannot maintain a suit because of endeavors to extend its monopoly to include unpatented parts, by express or implied licenses, or by notices to the trade, or by requiring the purchase from it of the unpatented materials for use in practicing the patented invention, the competitor who supplies such unpatented parts should not be held a contributory infringer of the patent.

Invalidity of Freeman Patent.

The Court of Appeals affirmed the judgment of the District Court in holding that the Freeman patent in suit displays invention and is valid. Inasmuch as there is no fact issue as to the disclosures of the prior art patents and printed publications and catalogues, the question whether Freeman made an invention is one of law and not of fact.

This Court in *Market Street Ry. Co.* v. *Rowley*, 155 U. S. 621, 625, stated the law as follows:

> "The defendant put in evidence a number of patents prior in date to the plaintiff's, and asked the court to compare the inventions and devices therein described with those claimed by the plaintiff. No extrinsic evidence was given or needed to explain terms

of art, or to apply the descriptions to the subject matter, so that the court was able, from mere comparison, to say what was the invention described in each, and to affirm from such mere comparison whether the inventions were or were not the same. The question was, then, one of pure construction and not of evidence, and consequently was matter of law for the court, without any auxiliary fact to be passed upon by the jury.

"If, upon the state of the art as shown to exist by the prior patents, and upon a comparison of the older devices with those described in the patent in suit, it should appear that the patented claims are not novel, it becomes the duty of the court to so instruct the jury."

Petitioner is not seeking a retrial of facts, but merely a proper application of the law to the facts found by the courts below. Accepting the findings of the trial court (R. 1067-1068) that no single prior patent or publication described, and no proved installation of prior use embodied, both fan and limit circuits controlled by a single room thermostat, the question of law is presented whether the bringing together in a hot air furnace of the two separately old circuits, one for controlling the fan and, the other for controlling the rate of combustion, constituted a statutory invention or mere aggregation of old elements.

That the evidence of prior installations was held by the trial court not sufficiently strong to invalidate the Freeman patent, is not surprising, when respondent after giving petitioner notice of infringement in November, 1932, did not institute suit until July 1st, 1940, nine years after the Freeman patent was granted.

The question is whether or not, under the law, the old parts constituting the patented system, when brought together by Freeman, constituted a patentable combination of cooperating elements, or the mere aggregation of old elements in which each continued to perform the function which it had previously performed in other connections.

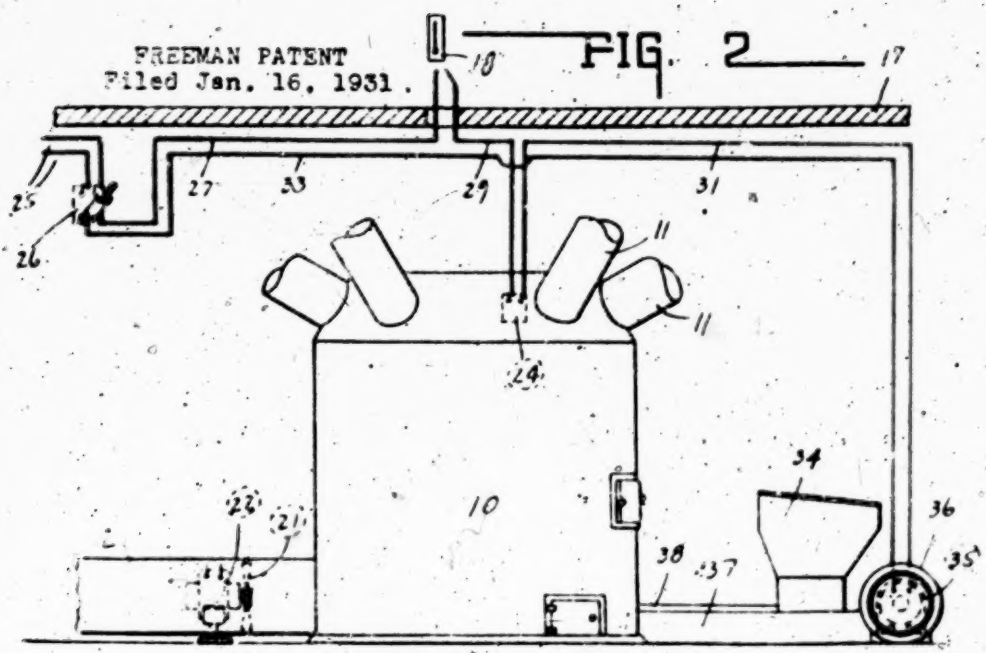
In the Freeman system, the circuit for controlling the operation of the fan and that for controlling the generation of heat are entirely independent of each other. The circuit for controlling the fan operates when the thermostat in the hood of the furnace reaches a predetermined degree, irrespective of whether such degree of temperature in the hood is sufficient to actuate the limit switch 24 to open or close the circuit to the damper controller 19 in Figure 1, or the stoker motor 35 in Figure 2. The printed publication art prior to the filing of the application for the Freeman patent discloses furnaces equipped with the fan circuit of Freeman, and also furnaces equipped with the combustion controlling circuit of Freeman, each of such circuits being opened or closed by the room thermostat in the space to be heated.

We here reproduce for convenient reference Figure 2 of the Freeman patent, the fan circuit having been omitted, and the stoker motor circuit colored red, and for purpose of convenient comparison we have shown on the same sheet the circuit illustrated in the Mercoid bulletin D of 1924 (R. 797) for an oil burner comprising a fuel motor and a limit switch entitled "Mercoid Temperature Control Switch," and the usual room thermostat.

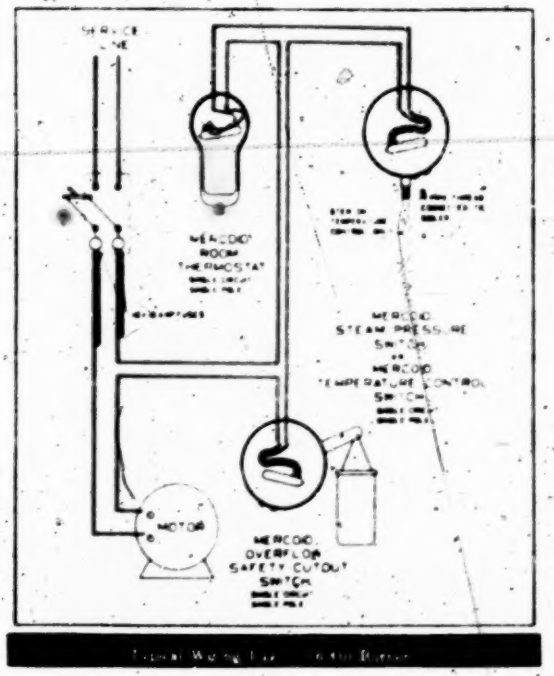
The Freeman system comprises a circuit for a fuel motor 35 controlled by a room thermostat 18, and a thermostatic limit switch 24, and such a circuit is disclosed in the Mercoid Bulletin D of 1924.

FREEMAN PATENT
Filed Jan. 16, 1931.

FIG. 2



MERCOID
BULLETIN D
1924



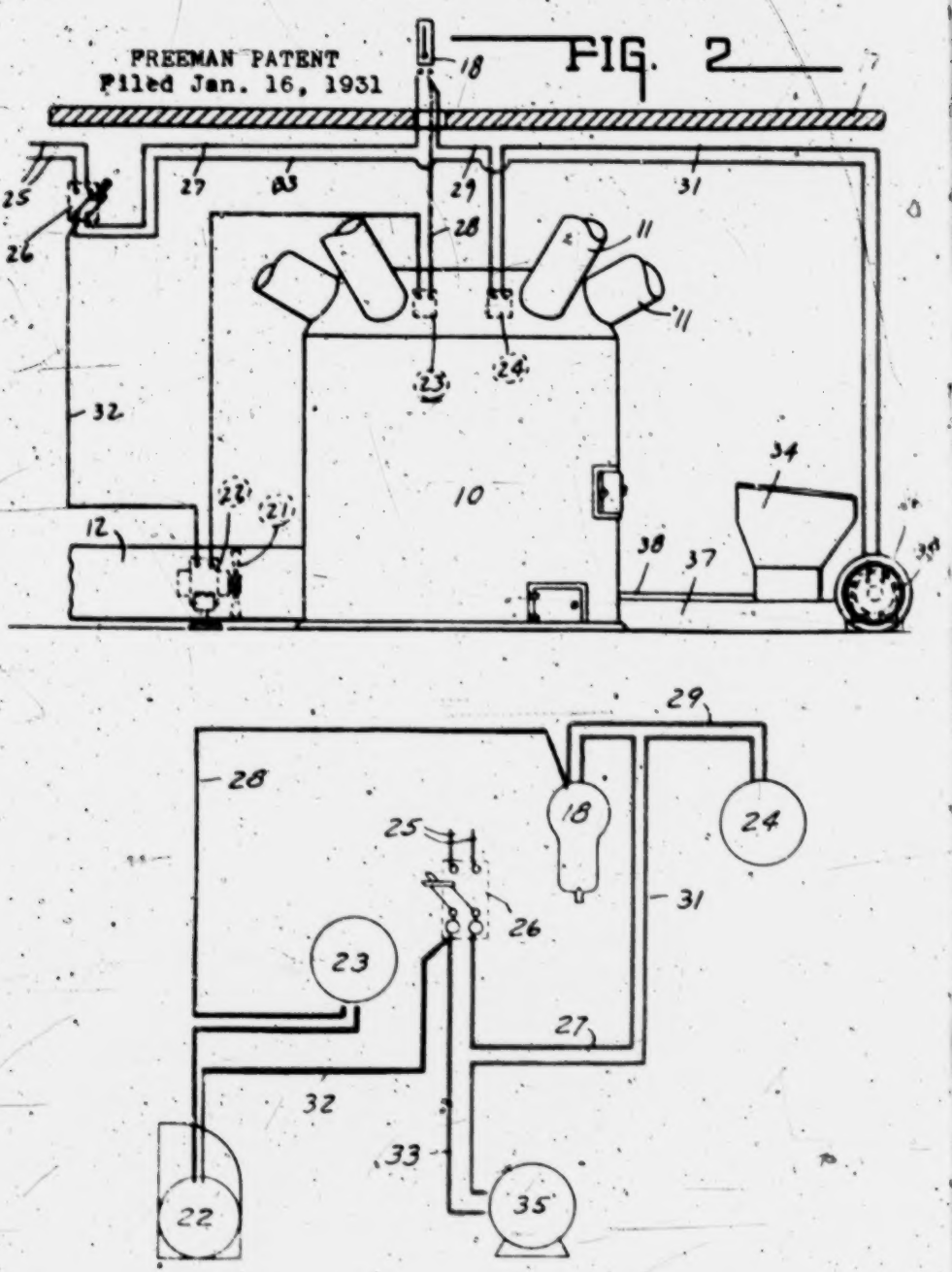
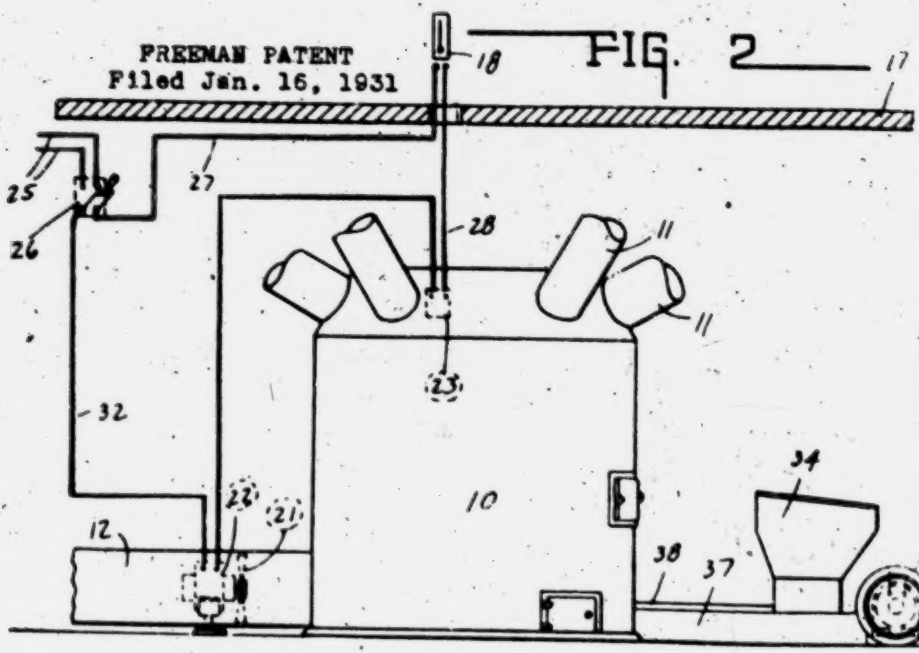


ILLUSTRATION 4 SUPERIMPOSED UPON BULLETIN D



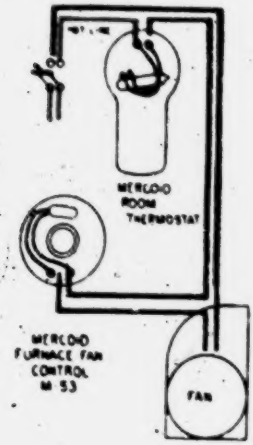


Illustration 4
Simple diagram generally used for coal burning applications.

MERCOID BULLETIN A-5
June 1930

For convenient reference, we also here present a copy of Figure 2 of the Freeman patent, showing in blue the circuit for the fan motor 22, controlled by the room thermostat 18 and thermostatic switch 23, the circuit for the stoker motor 35 having been omitted, and a drawing from Mercoid bulletin A-5 of June, 1930 (R. 841), showing a fan circuit, also colored blue, controlled by the usual room thermostat and a thermostatic switch subject to the furnace heat.

The Freeman patent, so far as it comprises a fan circuit controlled by the usual room thermostat, and also by a thermostatic switch in the bonnet of the furnace, is the same as disclosed in said Mercoid bulletin of June, 1930, which was published prior to the filing of the application for the Freeman patent.

We also present at this point a drawing showing Figure 2 of the Freeman patent, and a drawing showing the limit control circuit of Mercoid bulletin D of 1924 and the fan control circuit of Mercoid bulletin A-5 of June 1930, aggregated for use in the furnace.

All that the system of the Freeman patent comprises therefore is equipping a furnace with both the fan control circuit and the limit control circuit separately disclosed in prior publications. Obviously, in equipping a furnace with both a fan circuit and a limit circuit, a single room thermostat would be used rather than separate room thermostats for the fan circuit and limit circuit.

That the system disclosed and claimed in the Freeman patent involves no invention is supported by many pertinent decisions of this Court. This Court in *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, 89, 90, in holding invalid the patent in suit for lack of invention, said:

> "More must be done than to utilize the skill of the art in bringing old tools into new combinations."

The following quotations from the decision of this Court in the said case are pertinent to the case at bar:

> "And so the question is whether it was invention for one skilled in the art and familiar with Morris and Copeland, and with the extensive use of the automatic thermostat control of an electric heating circuit, to apply the Copeland automatic circuit to the Morris removable heating unit in substitution for a circuit manually controlled."
>
> * * * *
>
> "To incorporate such a thermostatic control in a so-called 'wireless' or 'cordless' lighter was not to make an 'invention' or 'discovery' within the meaning of the patent laws. As we have shown, both the thermostatically controlled heating unit and the lighter with a removable plug bearing the heating unit were disclosed by the prior art. More must be done than to utilize the skill of the art in bringing old tools into new combinations. * * *
>
> "We may concede that the functions performed by Mead's combination were new and useful. But that

does not necessarily make the device patentable. Under the statute (35 U. S. C. § 31; R. S. § 4886) the device must not only be 'new and useful,' it must also be an 'invention' or 'discovery'."

In *Mantle Lamp Co.* v. *Aluminum Products Co.*, 301 U. S. 544, 546, 547, this Court in holding the patent in suit invalid said:

> "We are of opinion that all the elements of the patent were old and aggregation of them did not involve the exercise of inventive genius but of mechanical adaptation."
>
> * * * * * *
>
> "In short, anyone familiar with the prior art needed only by exercise of mechanical skill to combine known methods and structures and so attain the combination exhibited in the patent. The judgment is affirmed."

In *Altoona Publix Theatres Inc.* v. *American Tri-Ergon Corp.*, 294 U. S. 477, 486, this Court made the following statement which is pertinent to the instant case:

> "The patentees brought together old elements, in a mechanism involving no new principle, to produce an old result, greater uniformity of motion. However skillfully this was done, and even though there was produced a machine of greater precision and a higher degree of motion-constancy, and hence one more useful in the art, it was still the product of skill, not of invention."

Another recent pertinent decision of this Court is that in *Textile Machine Works* v. *Louis Hirsch Textile Machines*, 302 U. S. 490, 497, from which the following quotations are made:

> "The addition of the reversing mechanism, used by Nusbaum and previously used in the full-fashioned machine, to the elements exhibited by the Gotham, for

the purpose of effecting variations in the throw of the secondary yarn carrier in precisely the manner in which the throw of the primary yarn carrier had been controlled in full-fashioned machines, was plainly not invention. The addition of a new and useful element to an old combination may be patentable; but the addition must be the result of invention rather than the mere exercise of the skill of the calling, and not one plainly indicated by the prior art. *Electric Cable Joint Co.* v. *Brooklyn Edison Co.*, 292 U. S. 69, 79, 80; *Altoona Publix Theatres* v. *American Tri-Ergon Corp.*, 294 U. S. 477, 486. The art of machine design in the knitting machine field is a highly developed one. The addition to the combination of the Gotham attachment of a means for automatically reversing the rotary threaded spindle to perform the very function it had performed in the full-fashioned knitting machine was not beyond the skill of the art and was plainly foreshadowed, if not completely anticipated, by Nusbaum."

The following statement made by this Court in *Toledo Pressed Steel Co.* v. *Standard Parts, Inc.*, 307 U. S. 350, 353, 355, is pertinent:

"The claims involved are printed in the margin. Considered together, unobscured by artificiality in their statement, it fairly may be said that they show that all that the patentees did was to put over the wick of a torch, well known in the art, an inverted metal cup-like cap having holes in its sides, some to let in air for combustion and others to let out flame. The cap was also well known and had been used as a part of other devices for the protection of kerosene and other flames. • • •

"The torch body was old in the art to which it belonged. The cap, as part of devices used in other fields, was old and useful to prevent extinguishment of flames by wind or rain and to permit flames to extend through holes to the open air. The problem patentees set for themselves was to prevent extinguishment while preserving usefulness of the flames as warning signals.

> They solved it by merely bringing together the torch and cap. As before, the torch continued to produce a luminescent, undulating flame, and the cap continued to let in air for combustion, to protect the flame from wind and rain and to allow it to emerge as a warning signal. They performed no joint function. Each served as separately it had done. The patented device results from mere aggregation of two old devices, and not from invention or discovery."

That mere mechanical skill and not invention was required to equip a hot air furnace with fan and fuel control circuits, each controlled by a separate thermostatic switch subjected to the heat generated in the furnace, is abundantly evident from the evidence, which shows that long prior to the filing of the application for the Freeman patent, Mercoid and its customers in correspondence described the use of a fan control in connection with a limit control hooked up together in an automatic heating system. Included in such correspondence were letters written in January, 1926, by Peninsula Burner and Oil Co. to petitioner's predecessor, Federal Gauge Co., and by Federal to the said company (R. 933-935); the letter of the Miller Automatic Services to Federal and Federal's reply in October, 1926 (R. 939, 941); the letters written by Federal to Socony Burner Corp. in December, 1927 (R. 949), and to Premier Warm Air Heater Co. in April, 1927 (R. 947), and by petitioner to the XX Century Heating and Ventilating Co. (R. 953).

The Circuit Court of Appeals in the instant case in stating "The accused device has no other use than for accomplishing the sequence of operations of the Freeman patent," in effect declares that all uses of fan and limit controls in a heating system produce the Freeman patent system, for the M-80 shares identity with separate fan and limit controls still sold today and since 1925. The fan and limit switches as found in the accused device

(M-80) retain the same identity of purpose, use and function as the switches in the separate fan and limit controls of 1925 and today.

Whatever the uses which the 1925 and later fan and limit switches (such as indicated by 23 and 24 in the Freeman patent) found, whether installed with or without instructions, represent on the part of the supplier of instructions, or of the persons bringing about the installation, exercise of mere mechanical skill, in no way reaching the dignity of an invention to be claimed by any one person.

The fact that a room thermostat must be used when a fan circuit and a combustion controlling circuit are supplied in a hot air furnace, was admitted by respondent's expert witness, Van Deventer (R. 444), as follows:

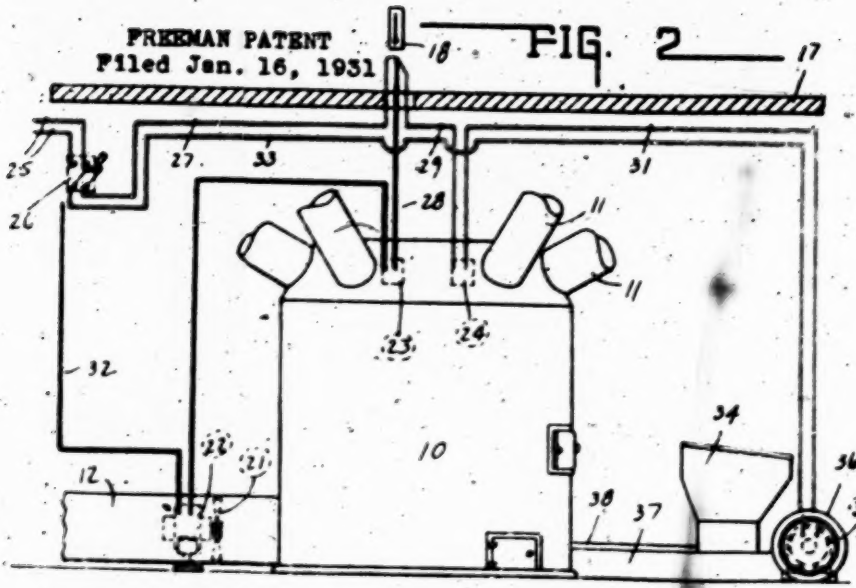
> "Q. In an automatic furnace control you would have to have a room thermostat, would you not?
>
> "A. I should think so.
>
> "Q. You would have to infer that that is part of the system when you refer to the limit control and the fan control?
>
> "A. I think so.
>
> "Q. The same as it could be said to be inferred in these letters of 1926 and 1927 and 1928 to the Mercoid Corporation when they did not mention specifically a room thermostat, but it was a heating system for an oil burner. You have to read in between the lines, do you not?
>
> "A. I think you have got to have a thermostat."

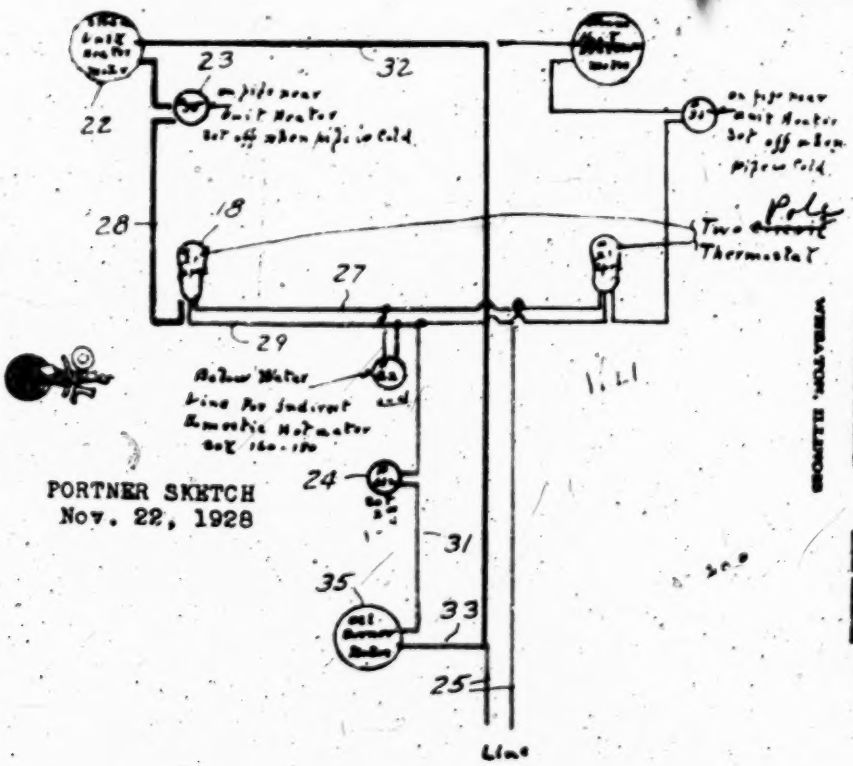
The fact that such correspondence in all instances did not refer to a single room thermostat as being included in both the fan and limit circuits, does not negative the pertinency of such correspondence.

The correspondence shows that Mercoid, years before the application for the Freeman patent was filed, was giving

PREEMAN PATENT
Filed Jan. 16, 1931

FIG. 2





PORTNER SKETCH
Nov. 22, 1928

J. A. PORTNER

instructions to prospective customers as to the use of its thermostatic controls in equipping a furnace with fan and limit circuits, similar to the instructions which it gives to purchasers of its M-80 thermostatic device, and which instructions were commented upon by the Court of Appeals in adjudging that petitioner had contributorily infringed the Freeman patent. It is a well recognized principle of patent law that that which infringes if later, invalidates if earlier (*Knapp* v. *Morse*, 150 U. S. 221, 228).

There moreover is evidence that it is obvious to one skilled in the art that a single room thermostat should be used for controlling both the fan and limit circuits. Mr. Portner, long experienced in the heating equipment art, submitted a sketch to petitioner in November, 1928 (R. 961), which together with Figure 2 of the Freeman patent, is presented on the page here inserted, the fan circuit being indicated in blue and the limit circuit in red to facilitate comparison.

The trial court held that the evidence was insufficient to prove that certain installations, including that of Portner were made at a date prior to the filing of the application for the Freeman patent, and of course such finding of fact must now be accepted by petitioner. However, there is no question as to the authenticity of the correspondence, which discloses that the use of fan and limit controls for a hot air furnace were within the knowledge of those skilled in the art, long prior to Freeman.

The sale of fan and limit controls by petitioner has continued since 1925. The wiring diagrams, catalogues, and correspondence disclosing various uses for such controls in the heating systems illustrate what was the common knowledge of those skilled in the art. Indeed, if any invention is disclosed in the Freeman patent it was made by Portner and Williams Oil-O-Matic, and not by Free

man, in view of their wiring diagram disclosures of November, 1928, and May, 1927, showing the system of control represented in 1931 by the wiring diagram of the Freeman patent.

Petitioner respectfully submits that in the interests of the public this Court should determine whether the Freeman patent discloses a statutory invention or a mere aggregation of old elements.

In recognizing that a court will consider the question of validity if it regards it necessary to do so in order to protect the public interests, in *Muncie Gear Works* v. *Outboard, Marine & Mfg. Co.*, 315 U. S. 759, 768, this Court said:

> "We think the conclusion is inescapable that there was public use, or sale, of devices embodying the asserted invention, more than two years before it was first presented to the Patent Office. We are not foreclosed from a decision under § 4886 on the point by the obscurity of its presentation in the courts below. This issue has been fully presented to this Court by the petition for a writ of certiorari, and in subsequent briefs and arguments; and there is not the slightest indication that respondents have been prejudiced by such obscurity. To sustain the claims in question upon the established and admitted facts would require a plain disregard of the public interest sought to be safeguarded by the patent statutes, and so frequently present but so seldom adequately represented in patent litigation."

As far back as the October term 1880, this Court stated in *Densmore* v. *Scofield*, 102 U. S. 375, 378:

> "But, irrespective of this testimony, and of any testimony, upon looking this reissue in the face, and examining its several claims by their own light, we find nothing that brings any of them within the sphere of

what is properly patentable. * * * It does not appear (to use the language of appellants' brief) that there was 'a flash of thought' by which such a result as to either was reached, or that there was any exercise of the inventive faculty, more or less thoughtful, whereby anything entitled to the protection of a patent was produced. * * *

"*Patentees as a class are public benefactors, and their rights should be protected. But the public has rights also. The rights of both should be upheld and enforced by an equally firm hand, whenever they come under judicial consideration.*"

In *Haughey* v. *Lee*, 151 U. S. 282, 285, this Court again recognized the duty of the courts to protect the interests of the public in patent suits as follows:

"Besides, the defence of want of patentable invention in a patent operates not merely to exonerate the defendant, but to relieve the public from an asserted monopoly, and the court cannot be prevented from so declaring by the fact that the defendant had ineffectually sought to secure the monopoly for himself."

To the same effect is the more recent decision of this Court in *Paramount Publix Corp.* v. *American Tri-Ergon Corp.*, 294 U. S. 464, 477, from which the following statement is quoted:

"However inconsistent this early attempt to procure a patent may be with petitioner's present contention of its invalidity for want of invention, this Court has long recognized that such inconsistency affords no basis for an estoppel, *nor precludes the court from relieving the alleged infringer and the public from the asserted monopoly when there is no invention.*"

CONCLUSION.

It is submitted on behalf of petitioner that respondent is using the Freeman patent to monopolize an unpatented device and therefore cannot maintain this suit; that petitioner, having merely made and sold an unpatented thermostatic device for use by purchasers in installing the hot air heating system of the Freeman patent, cannot be held a contributory infringer; that respondent has conspired to substantially lessen competition and create a monopoly in violatioin of the Anti-Trust laws; that in the interests of the public this Court should determine the question of validity of the Freeman patent, and that the judgment of the Court of Appeals for the Seventh Circuit should be reversed.

Respectfully,

GEO. L. WILKINSON;
Counsel for Petitioner,
The Mercoid Corporation.

September 24th, 1943.
Chicago, Illinois

IN THE

Supreme Court of The United States

OCTOBER TERM, A. D. 1943.

Nos. 58, 59.

THE MERCOID CORPORATION,

Petitioner,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,

Respondent.

REPLY BRIEF FOR PETITIONER.

GEORGE L. WILKINSON,
Counsel for Petitioner.

MC CORMICK AND HENDERSON, INC., CHICAGO

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THE MERCOID CORPORATION,
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Respondent.

REPLY BRIEF FOR PETITIONER.

Petitioner's original brief quite fully anticipated the arguments presented in respondent's brief, and petitioner will briefly reply merely to several contentions advanced by respondent.

Inasmuch as the questions of improper use of the Freeman patent, violation of the Anti-Trust laws, and contributory infringement are so closely allied as to underlying facts and applicable law, they will not be separately discussed in replying to respondent's arguments.

The combination furnace control which respondent requires its licensees to sell at not less than specified prices; which respondent requires the users of the patented systems to purchase from it; from the sales of which, and royalties

Note: Emphasis is ours, unless otherwise stated.

paid thereon by licensees, respondent derives its entire revenue from its patent, and which respondent is specifically monopolizing, is admitted by respondent (Brief, page 5, and elsewhere) to be "less than the complete claimed invention" of the Freeman patent.

In considering the legal questions presented, the combination furnace control therefore may admittedly be regarded as unpatented, as no principle of patent law is more firmly established than that a patent for a combination of elements, or a system comprising a plurality of parts, is not a patent for the individual elements or parts, and that a patent does not monopolize "less than the complete claimed invention".

IMMATERIAL WHETHER PETITIONER'S UNPATENTED M-80 THERMOSTATIC SWITCH IS ADAPTED FOR USE ONLY IN THE FREEMAN SYSTEM OF FURNACE CONTROL.

Counsel for respondent seek to distinguish the case at bar from the decisions of this Court in the *Carbice* case, 283 U. S. 27, and the *Leitch-Barber* case, 302 U. S. 458, by contending that respondent's M-80 thermostatic switch "has no use other than in the Freeman system or combination" (brief p. 6), whereas in the *Carbice* case the dry ice, and in the *Leitch-Barber* case the bituminous emulsion, were staple articles of commerce.

The controlling factor in each of the said decisions of this Court was that the article sold by the alleged contributory infringer was not covered by the complainant's patent, and hence the complainant was seeking an unauthorized extension of its monopoly. If the article is unpatented, there obviously would be an unauthorized extension of the monopoly irrespective of whether it is a staple commodity or especially adapted for use in practicing the patented

invention. Such is the logical construction of the said decisions of this Court by the Courts of Appeals for the Second and First Circuits. In *Philad Co.* v. *Lechler*, 107 F. 2d 747, 748, the Circuit Court of Appeals for the Second Circuit said:

> "It is urged that the rule of the *Carbice* case covers only an effort of a patentee to control the use of staple materials, carbon dioxide in the *Carbice* case, bituminous emulsion in the *Leitch* case," • • • "There is no support for any such limitation on the rule. In both the *Carbice* case and the *Leitch* case the emphasis was on the fact that the articles handled by the alleged contributory infringers were not covered by the patent."

In *B. B. Chemical Co.* v. *Ellis*, 117 F. 2d 829, 834, the Circuit Court of Appeals for the First Circuit said:

> "The plaintiff seeks to prevent the application of this rule to this case by limiting the doctrine to those situations in which the alleged contributory infringer supplies staple articles of commerce. • • • We do not consider that to have been intended as a limitation upon the doctrine of the *Leitch* and *Carbice* cases. The language of those cases is extremely comprehensive and is by no means restricted to staple articles. • • • There is every indication that the *Carbice* and *Leitch* cases apply to specifically designed non-patented articles."

The record in the case at bar however does not support respondent's contention, and the comment of the Court of Appeals, that petitioner's M-80 thermostatic switch "has no other use than for accomplishing the sequence of operations of the Freeman patent".

The trial court made no such finding of fact, as obviously it would not have been supported by the evidence.

Neither petitioner's nor respondent's witnesses so testified. They testified that petitioner's M-80 thermostatic switch was the same functionally as the earlier switches,

M-51 and M-53, of Mercoid, and the separate switches 23 and 24 diagrammatically shown in the Freeman patent. Petitioner's expert witness Black said:

> "So that whereas in the past an M-51 and an M-53 may be installed on the same heating furnace and the wires brought to each of the individual instruments, we can in the M-80 control bring all of the wires in a single casing and there connect them to the fan switch and the limit switch.
>
> The function of the M-80 control is identical with the function, purpose and use of the M-51 and M-53 when used together." (R. 187.)

Respondent's expert witness Van Deventer testified:

> "Q. Then that structure that you have in your hand, the M-80, is not a combination of the 23 and 24 instruments shown in the Freeman patent, is it?
>
> A. It is so far as its circuits are concerned, . . . " (R. 439.)
>
> . . . . . .
>
> "I said that the mechanism in the M-80 was of a type that would permit the independent operation of the two circuit switches, that is, 23 and 24, independently of each other. That is what the prior art instruments will do." (R. 440.)
>
> . . . . . .
>
> "In the M-80 they are both dependent for physical operation on a single spiral, and you must have in that M-80 job something that will permit each tube to operate independently of the other tube and at the same time be operated by the spiral." (R. 440-441.)

Petitioner in its thermostatic switch M-80 merely embodied in a unitary structure its separate fan and limit thermostatic switches M-51 and M-53 (R. 186), and obviously to anyone familiar with the control of electric circuits by thermostatic switches, the M-80 is capable of the same uses as are the separate switches when used together. The M-80 has four binding posts to which are connected the

wires of the two circuits, one including the fan motor and the other the fuel motor. The M-80 clearly would be equally useful if its binding posts were connected to the wires of any other two circuits which it might be desired to thermostatically control.

RESPONDENT'S INCONSISTENT POSITIONS.

In 1932, four years before petitioner combined its separate standard, conventional switches M-51 and M-53 into its M-80, respondent notified petitioner that it infringed the Freeman patent (R. 789), and after it had granted licenses to five competitors under the Freeman patent, it notified them (R. 891) that the Freeman patent would not be asserted against them if they sold separate switches for use in the Freeman patent for not less than 25% more than they sold combination switches for that purpose, thereby in effect advising them that they would be liable as infringers of the Freeman patent if they sold separate switches for use in the Freeman system for less than the said price.

However, respondent in its brief, page 26, states:

> "Mercoid is not being sued for any such sales of 'separate' controls,"

and on page 14 states:

> "Honeywell is not accusing Mercoid as a contributory infringer on account of any conventional or standard controls sold by Mercoid."

And yet the only controls suggested in the Freeman patent are conventional or standard controls 23 and 24.

On pages 40 and 41 of their brief, counsel for respondent say:

> "Mercoid's reasoning is faulty —
> *first*, because it implies, but does not dare say, Honey-

> well has asserted that the M-80 is the equivalent of these early fan and limit switches. Honeywell denies that."

Obviously counsels' statement is limited to *structural* equivalency as respondent's expert witness Van Deventer stated (R. 441) that the M-80 attains the same results in the Freeman system as do the separate controls M-51 and M-53.

Respondent therefore is in the anomalous position of expressly denying that it is asserting contributory infringement against petitioner on account of its sale of switches of the only type disclosed and suggested in the Freeman patent, and asserting infringement against petitioner solely because of its sale of the switch mechanism M-80 not disclosed or suggested in the Freeman patent, and which it indignantly denies is the equivalent of the only fan and limit switches indicated in the Freeman patent.

FREEMAN'S ALLEGED ADVANCE IN THE ART.

Respondent, in an effort to avoid the pertinency of the *Carbice* and *Leitch-Barber* decisions of this Court, and to justify its conduct under the much earlier decision in the *Leeds & Catlin* case, 213 U. S. 325, asserts on page 38 of its brief that the licensed combination furnace control and petitioner's combination control M-80 "are so constructed and marketed that they measure, mark and embody Freeman's 'advance in the art'. They are the heart and essence of Freeman's contribution."

However, on page 41, counsel for respondent say regarding the 1927 early system of petitioner:

> "All the Mercoid system lacked was the heart of the Freeman arrangement. It had separate controls

that might have been wired to accomplish the Freeman system, but were not."

* * * * *

"What Mercoid neglects to tell the Court is that *now*, after learning from Freeman, Mercoid wires the switches in the M-80, *not* according to Mercoid's old scheme, but according to Freeman."

Respondent's counsel, forgetting for the moment their argument that the combination control is "the heart and essence of Freeman's contribution", and embodies his "advance in the art", state that the *heart* of the Freeman arrangement is the wiring of the controls and switches.

It is a well established principle of patent law that when a patented invention resides in a combination of cooperating elements, all of the elements, and no one of them alone, constitutes the "advance in the art" and the "essence of the patent".

This Court in *Schumaker* v. *Cornell*, 96 U. S. 549, 554, stated the law as follows:

"The patent is well entitled for an improvement. It could be for nothing more.

Nothing is claimed separately. Every thing is claimed together and in the aggregate. If any thing was withdrawn, and no equivalent supplied in its place, the instrument would be a failure. Each element is a part of a compound unit, and is necessary to the completeness and efficacy of the result."

This Court in *Rowell* v. *Lindsay*, 113 U. S. 97, 101, again stated the law upon this point as follows:

"The patent of the plaintiffs is for a combination only. None of the separate elements of which the combination is composed are claimed as the invention of the patentee, therefore none of them standing alone are included in the monopoly of the patent. As was said by Mr. Justice Bradley in the case of *The Corn-*

Planter Patent, 23 Wall. 181, 224: 'Where a patentee, after describing a machine, claims as his invention a certain combination of elements, or a certain device, or part of the machine, this is an implied declaration, as conclusive, so far as that patent is concerned, as if it were expressed, that the specific combination or thing claimed is the only part which the patentee regards as new. True, he or some other person may have a distinct patent for the portions not covered by this; but that will speak for itself. So far as the patent in question is concerned, the remaining parts are old or common and public.' See also *Merrill* v. *Yeomans*, 94 U. S. 568, 573; *Water Meter Co.* v. *Desper*, 101 U. S. 332, 337. *Miller* v. *Brass Co.*, 104 U. S. 350. These authorities dispose of the contention of the plaintiff's counsel that their patent covers one of the separate elements which enters into the combination, namely, a slotted wooden beam, because, as they contend, that element is new, and is the original invention of the patentees.'

This Court in its later decision in *Leeds & Catlin* v. *Victor*, 213 U. S. 301, 318, again stated the law as follows:

"* * * Certainly, one element is not the combination nor in any proper sense can it be regarded as a substantive part of the invention represented by the combination, and it can make no difference whether the element was always free or becomes free by the expiration of a prior patent, foreign or domestic."

In view of the foregoing authorities, the Court of Appeals and respondent are in error, as a matter of law, in holding that the furnace control, which is only one of several cooperating elements of the combination in which Freeman's system resides, is the "advance in the art" or the "essence of Freeman's patent."

PETITIONER'S M-80 INSTRUCTIONS.

Respondent in support of its charge of contributory infringement lays much stress on the fact that petitioner gives instructions in its catalogues and to purchasers regarding the use of its M-80 thermostatic control. Petitioner's business is and has been for many years the manufacture and sale of temperature and pressure control switches, and it has made a practice of informing its customers as to the uses of its products and the circuits which they may control.

As illustrative of this practice of petitioner, reference is made to its Bulletin D, of April 1, 1924 (Exhibit U, R. 797), containing a circuit diagram and description of its temperature and pressure controls applied to an oil burner; to its catalogues H-3 of 1928 (Exhibit X, R. 807), and H-5 of 1929 (Exhibit Y, R. 817), each containing many wiring diagrams (R. 815 and 827) illustrating various uses of its controls in heating systems, and to its catalogue of August, 1931 (R. 847), illustrating fan and limit circuits controlled by separate thermostatic switches, as to which respondent expressly does not charge contributory infringement (Respondent's Brief, page 14).

Petitioner is not accused of anything but contributory infringement. Its acts complained of are selling controls and telling its customers how to use them. These acts were the same prior to Freeman as subsequent to Freeman.

To the manufacturer, such as petitioner, of thousands of temperature and other circuit controlling devices, many involving modifications of existing devices, the intended use by the purchaser is not always known to or of concern except as to the details involved in the particular device desired by the customer to fill an expressed need. The instructions accompanying the sale of controls are

representative of the choice of and are largely dictated by the consumer according to his suggested use, and there is no requirement on the part of the control manufacturer as to how the control should be used. Petitioner is interested in selling controlling devices, and their sale is made to its customers for them to use in the best way that their particular application or skill or past experience justifies or demands. Petitioner is not interested in all the uses to which its products may be put, but only in their sale. It is recognized that uses of temperature controls are varied and may require certain modifications to suit the particular needs of users.

ALLEGED SAFETY FEATURE OF FREEMAN SYSTEM.

In support of its argument that the Freeman system involves invention, respondent repeatedly asserts that it avoids an otherwise dangerous condition in the use of domestic furnaces. Respondent contends that as the fan circuit is closed by the temperature in the furnace, continued operation of the fan, even after the limit switch has opened and discontinued the supply of fuel, discharges from the furnace to the space to be heated excessively heated air. This argument of respondent ignores the fact that the limit switch is for the express purpose of preventing a dangerous heat in the furnace, and its controlling thermostat is so adjusted as to discontinue the supply of fuel before a dangerous degree of heat is generated. This contention by respondent also ignores the fact that, as disclosed in the Freeman patent, the circuit for the fan motor is open and the delivery of heated air from the furnace is discontinued at all times when the temperature in the heated space has caused the room thermostat to

open. The Freeman specification, page 1, lines 79 to 87 states:

> " . . . Since the thermostat 18 is included in both these circuits and since the said thermostat is of the type to open its circuit when the room temperature is above a predetermined value, it is evident that the fan 21 will be stopped and the damper control will operate to check the fire whenever this predetermined room temperature is exceeded."

The real advantage in the Freeman system in providing a thermostat for continuing the operation of the fan motor to deliver latent heat from the furnace to the space to be heated, even after the supply of fuel has been discontinued, is the same as was necessarily present in the uses prior to Freeman of thermostats in a furnace for continuing the operation of the fan as long as a predetermined degree of heat exists in the furnace. If the continued operation of the fan motor, after the limit switch has opened the fuel motor circuit, is of any advantage in removing dangerous heat from the furnace, such advantage was not new in the Freeman system but existed whenever a furnace was provided with a thermostatic switch for continuing the operation of the fan motor as long as there existed a predetermined degree of heat in the furnace.

UNIVIS AND LEEDS AND CATLIN CASES.

Respondent principally relies in support of its arguments that its exploitation of the Freeman patent to monopolize an unpatented control is legal, and that the manufacture and sale of such unpatented control by petitioner constitutes contributory infringement of the Freeman patent, upon the decisions of this Court in *Leeds & Catlin* v. *Victor Talking Machine Co.*, 213 U. S. 325, and *United States* v. *Univis Lens Co.*, 316 U. S. 241.

In petitioner's original brief, the facts which distinguish the *Leeds & Catlin* case from the case at bar were pointed out. This Court explained in its later decisions in *Bassick* v. *Hollingshead*, 298 U. S. 105, and in *Lincoln Engineering Co.* v. *Stewart-Warner Co.*, 203 U. S. 445, that in the *Leeds & Catlin* case the flat disc record, the manufacture and sale of which was held to constitute a contributory infringement of the Berliner patent, possessed no utility except in combination with the stylus of a talking machine, and that "the disc not only performed a new function but performed it in combination with another new element,—the swinging arm which carried the needle."

In the case at bar, the typical thermostatic switches disclosed in the Freeman patent, which respondent through its practices is monopolizing under the Freeman patent, possessed utility, and had long been used for controlling various circuits, prior to the Freeman system. In the Freeman system they perform only the same function which they have always performed; namely, that of opening or closing circuits according to the temperature to which they are subjected. It is indeed a far cry to compare the disc record in the *Leeds & Catlin* case with the old types of thermostatic switches employed in the Freeman system, where they perform no new function but only the function which they perform wherever used.

The *Univis* case was not one for contributory infringement. It was a suit instituted by the United States for violation of the Sherman Act. This Court held that the sale of the blank after it had been ground and polished constituted a resale of the previously sold blank. This Court said:

> "* * * The injunction of the District Court will therefore be continued, and extended so as to suppress all the license contracts and the maintenance

of the licensing system which appellees have established, other than the Corporation's license to the Lens Company."

The blank in the *Univis* case is clearly not comparable to the ordinary thermostatic switch used in the Freeman system.

Regarding the blank, this Court said:

> "The lens blanks are rough opaque pieces of glass of suitable size, design and composition for use, when ground and polished, as multifocal lenses in eyeglasses. Each blank is composed of two or more pieces of glass of different refractive power, of such size, shape, and composition and so disposed that when fused together in the blank it is said to conform to the specifications and claims of some one of the Corporation's patents." (p. 244.)

That this Court suggested that the sale of the novel blank by one unlicensed under the Univis patent would constitute a contributory infringement, has a very remote bearing upon whether the manufacture and sale by petitioner of an ordinary thermostatic switch for use in the Freeman system, performing the well-known characteristic function of a thermostatic switch, constitutes a contributory infringement of the Freeman patent.

FREEMAN'S ALLEGED SEQUENCE OF OPERATION.

Counsel for respondent throughout their brief iterate and reiterate that the Freeman system comprises a sequence of operation, and it is in such alleged sequence of operation that the asserted inventive novelty resides.

The sequence of operation is described in respondent's brief on page 8 as follows:

> "That sequence brings about fan operation only after the furnace temperature has attained a prede-

termined degree; further, that sequence, for safety purposes, both shuts down the burner and maintains continued fan operation when the furnace has reached a high, unsafe temperature."

Such alleged sequence of operation is not due to any control of the fan switch circuit by the switch of the fuel motor circuit, or vice versa. The circuits for the fan motor and for the fuel motor are separately and independently controlled. Mr. Van Deventer, respondent's expert witness, explained (R. 440) that the separate switches 23 and 24 of the Freeman patent, and the corresponding switches in petitioner's M-80, *operate independently of each other*, and "That is what the prior art instruments will do."

That the fan motor will continue to operate after the operation of the fuel motor is discontinued, is due solely to the fact that the thermostatic switch 23, which controls the fan motor circuit, operates at a lower degree of heat to close the fan circuit than does the thermostatic switch 24 to open the fuel motor circuit. Thus the fan motor circuit will be closed when the fuel motor circuit is opened, and latent heat in the furnace, after the supply of fuel has ceased, will be delivered to the heated room. The limit switch 24 will close the fuel motor circuit to supply fuel at a temperature lower than that necessary to close the fan motor circuit, so that the fan motor circuit will be closed to deliver air to the heated room only after the air has been heated to a predetermined degree of temperature.

In the Freeman system, the fan switch operates in the fan circuit the same as the prior fan switches to effect the same result, and the limit switch of the motor circuit operates to effect the same result as the prior limit

switches, both of which have been sold continuously by petitioner since 1924 (R. 141).

Any alleged sequence of operation of the Freeman system is merely an aggregation of separate and independent functions of the old fan and limit switches. In the Freeman system they do not in any wise modify or control the operation or function of each other.

An analysis of the Freeman alleged sequence of operation emphasizes that all Freeman did was to aggregate in a heating system two old thermostatic switches, one for controlling the fan circuit and the other for controlling the limit circuit.

CONCLUSION.

Petitioner submits that the arguments presented on behalf of respondent fail to support the judgment of the Circuit Court of Appeals for the Seventh Circuit, and that in view of the facts and the applicable law, it should be reversed.

Respectfully,

GEO. L. WILKINSON,
Counsel for Petitioner.

IN THE

Supreme Court of The United States

October Term, A. D. 1942

No. 994

No. 995

THE MERCOID CORPORATION,
Petitioner,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Respondent.

BRIEF OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY OPPOSING PETITION FOR WRIT OF CERTIORARI.

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To the Honorable, the Chief Justice and Associated Justices of the Supreme Court of the United States:

Respondent, herein sometimes called "Honeywell," submits this brief in opposition to the Petition for Writ of Certiorari.*

* The decision below is reported in 133 F. (2d) 811, and is in the Record p. 1225.

Respondent asserts that the Petition presents no ground which justifies the writ.

Petitioner's Position.

Petitioner complains that the decision from which relief is sought—

1. Conflicts with decisions of other Circuit Courts of Appeal, p. 5, 1. (a), and with decisions of this Court, p. 6, 2. (a), in holding the patent valid;

2. Conflicts with decisions of other Circuit Courts of Appeal, p. 5, 1. (b), and with decisions of this Court, p. 6, 2. (b), in finding contributory infringement;

3. Conflicts with decisions of other Circuit Courts of Appeal, p. 5, 1. (c); and with decisions of this Court, p. 7, 2. (c); in holding that the patentee is entitled to relief when it requires, as a condition to the use of the invention, that an unpatented part employed in the invention must be purchased from it or its licensees, p. 5, 1. (c); and

4. Conflicts with a Third Circuit decision, p. 6, 1. (d), and has decided an important question of Federal law which has not been but should be settled by this Court, p. 7, 3., in holding that there is no restraint of trade in violation of the Anti-Trust laws when the patent owner forbids purchase from competitors of unpatented parts necessary for the practice of the invention (p. 7, 3.) and fixes its licensee's selling prices, p. 4, 4.

Respondent answers that the record shows no conflict of decisions and no unsettled "important question of Federal law."

The Facts.

Respondent owns Freeman patent No. 1,813,732.

The provision of elements in a new arrangement for a particular sequence of operations is Freeman's "advance

in the art" (see paragraphs 2 and 3 of the Court of Appeals opinion, R. 1228).*

The claims relied on by Respondent for infringement are 1, 4, 6 and 9 (R. 1066, finding 9).

The accused device is Petitioner's M-80 (R. 1066, finding 7, and R. 1226).

Respondent Honeywell has granted licenses under Freeman to others, and offered a license to Petitioner Mercoid on the same terms and conditions, which was refused (R. 1229, top).

One of these licenses is on page 893 of the record.

The licenses provide for the payment of a royalty of 25 cents on each specifically defined "combination furnace control" sold (R. 896, III and R. 895, I).

The licenses fix the minimum prices at which the licensees sell the defined combination furnace controls manufactured by them (R. 899).

We note here in view of Petitioner's frequent use of the phrase "conflict of decisions," that no other Courts have had before them the facts, issues and parties involved here.

First Question.

Validity of Freeman Patent No. 1, 813,732.
*Conflict With Decisions of this Court and Circuit Courts of Appeal; p. 5, 1. (a), and 6, 2. (a).***

Petitioner argues that the concurrent findings of validity should be reversed because there is no invention in combining elements "all separately old in the prior art" and which "merely perform their old individual functions in a particular sequence," p. 4, 1.

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* R = Record.

** References to Petition and Brief therewith.

The District Court found the patent valid over prior art urged by Petitioner (Finding 19, R. 1068), and the Court of Appeals affirmed (R. 1231).

Neither Court, either directly, indirectly, or by inference, made any statement which supports the proposition raised by Petitioner in its "First Question."

What Petitioner really seeks is to have this Court review the facts and come to a different conclusion. This is clear from the cases relied upon by Petitioner, each of which holds that under the facts of the particular case, the alleged improvement did not amount to invention.

So far as this issue is concerned, we have here an ordinary patent suit in which the situation is analogous to that in

> *Williams Manufacturing Co.* v. *United Shoe Machinery Corp.*, 316 U. S. 364 (62 S. Ct. 1179),

in which this Court said, at p. 365:

> "The defendant sought certiorari on the ground that the claims were invalid under recent decisions of this court because they constituted attempts to repatent a broad combination of old devices. * * * In pressing us to grant the writ, the petitioner insisted that it desired no retrial of the facts but merely a proper application of the law to the facts found by the courts below. * * *".

And, at p. 366, bottom, and p. 367:

> "In argument, however, petitioner sought to overturn the concurrent findings below and to have us redetermine the question of the novelty and usefulness of the improvements described in the combination claims held valid and infringed."
>
> "The courts below have concurrently found that none of the earlier patents cited, including that of McFeely, embodied the combinations of the challenged claims * * *".

"These findings are to the effect that the new combinations, while they involve old mechanical constructions, combine these in a new way so as to produce an improved result. These are findings of fact, despite the petitioner's apparent contention to the contrary, and we will not disturb such concurrent findings where as here, there is evidence to support them. The claim that the combinations are merely of old elements, which perform no new function and produce no new result, must be overruled. * * *"

There is no conflict with the decisions of this Court or of other Circuit Courts of Appeal, but merely a request that this Court review the facts, and overturn the concurrent findings of the Courts below.

There is therefore no proper ground for certiorari.

Second Question.

Contributory Infringement.

Conflict With Decisions of this Court, p. 6, 2. (b), and of Other Circuits, p. 5, 1. (b).

Petitioner complains that the Court below held it a contributory infringer in supplying "an unpatented part designed for use, and knowing that it is to be used, in practicing the patented invention, * * *" p. 4, 2.

Petitioner's statement is an inaccurate and incomplete statement of the findings below.

In any event, on the facts, either as stated by Petitioner or as found by the Court below, there is no conflict of decisions.

The Courts Below.

Petitioner does not state, but the District Court found, that with each accused M-80, Petitioner sent out illustrations 7 and 8 for its installation (R. 1069, findings 24 and 22).

Petitioner's expert admitted (R. 269-270), and the District Court found (R. 1069, Findings 22, 24, 25), Petitioner does not now deny, and the Court of Appeals found (R. 1228, bottom), that when the M-80 is installed according to the illustrations recommended therefor by Petitioner, the completed structure infringes all of the claims in issue.

The Circuit Court of Appeals found that Petitioner's accused M-80 was especially adapted for use in practicing the patented system, and that it has

"no other use" (R. 1228, bottom).

Petitioner's entire conduct is calculated to bring about an infringement of the Freeman patent. Its accused product and recommended instructions for the use of that product, never result in any installation other than one which infringes.

We find no decision denying contributory infringement under such circumstances.

Petitioner's position is not supported by its cited cases.

In discussing them, Petitioner confuses the issue of contributory infringement with the issues of improper use of the patent and improper claiming of the invention, and cites cases on such latter issues as though they were authorities on contributory infringement. Not a single case relied upon by Petitioner turned on what constitutes contributory infringement.

We briefly refer to the cases in the order used by Petitioner; p. 5, 1. (b) and p. 6, 2. (b).

In

B. B. Chemical Company v. *Ellis*, 117 F. 2d, 829,

the Court of Appeals for the First Circuit, contrary to Petitioner's statement, p. 5, 1. (b), found (p. 834):

> "There can be no doubt they are contributory infringers."

In

The Philad Co. v. *Lechler*, 107 F. 2d, 747,

the Circuit Court of Appeals for the Second Circuit did not hold there was no contributory infringement. The District Court held that under the facts the patent had been improperly used, and that no relief would be granted. The Court of Appeals affirmed the District Court in dismissing on this ground.

In

Carbice Corp. v. *American Patents Development Corp.*, 283 U. S. 27,

and

Leitch Mfg. Co. v. *Barber*, 302 U. S. 458,

although both Courts of Appeal below had found for the patent owner on the issue of contributory infringement, this Court refused relief on account of the improper use of the patent.

In

Bassick Mfg. Co. v. *Hollingshead Co.*, 298 U. S. 415,

this Court held that the invention was improperly claimed. There were no facts in that case similar to those in the case at bar. Under circumstances similar to those in the Bassick case, this Court held the patent invalid in

Lincoln Engineering v. *Stewart-Warner*, 303 U. S. 545.

In view of the fact that no conflict of decisions appears, Petitioner's "Second Question" presents no appropriate ground for certiorari.

Third Question.

Improper Use of Patent Precludes Maintenance of Suit. Conflict With Decisions of Other Circuits, p. 5, 1. (c) and of This Court, p. 7, 2. (c).

Petitioner complains, p. 4, 3., that the Court of Appeals should have refused relief on the theory that Respondent conditioned its licenses to others upon

> "the licensees purchasing from it an unpatented part for use in practicing the patented invention".

The Court of Appeals did not find the "combination furnace control" sold by Respondent and its licensees and by Petitioner (who was offered a license on the same terms and conditions, R. 1229) to be merely

> "an unpatented part for use in practicing the patented invention".

It found that in selling these controls Respondent and its licensees sell

> "the essence of Freeman's patent", R. 1229, line 9.

Again, what Mercoid really seeks is not clarification of the law on account of any conflict, but a review of the facts to the end that this Court may reach a different conclusion about them. That is not a proper situation for certiorari.

Petitioner makes no complaint about Respondent's written licenses, but purports to find evil in the implied license given the purchaser of a combination furnace control from Respondent or its licensees. The purchase carries with it an implied license to use the "combination furnace control" for its only purpose, to-wit: the installation of a

Freeman installation. Petitioner's theory is that this sale with such an implied license involves improper use of the patent to monopolize an unpatented control.

Petitioner does not tell the Court that this combination control is much more than an ordinary unpatented article. It is not a mere single element of the patented combination.

The control sold by Respondent and its licensees is a

"unitary structure"

including at least two switches—

"for controlling not less than two circuits"

and operated by

"temperature responsive means"

to establish one circuit

"on temperature rise"

and another

"on temperature fall",

and having permanent internal wiring connecting the switching means to terminals, such internal wiring being

> "so arranged that when the terminals are connected by external wires to a heat controlling mechanism • • • and to a means for controlling the circulation of the fluid" (fan), • • •
> "such structure, when used as intended embodies the system disclosed in and claimed by the Freeman patent" (R. 1229, second paragraph).

The Court below held that such control

> "• • • embodies the essence of Freeman's patent. Each of such controls brings about one complete Freeman installation • • •" (R. 1229, line 10).

The same is true of Petitioner's accused device of which the Court of Appeals said:

> "It provides for the sequence of operations which is the precise essence of Freeman's advance in the art. * * * The accused device has no other use than for accomplishing the sequence of operations of the Freeman patent." (R. 1228, bottom).

In this respect the accused controls are like the controls sold by Respondent and its licensees.

The Court of Appeals held that

> "* * * the record does not disclose any attempt on the part of Honeywell to collect a royalty on such control unless it is used or attempted to be used in a system which would infringe the Freeman combination." (R. 1229, first paragraph),

and that this conduct of Respondent and its licensees was such that

> "there is no attempt to illegally monopolize the sale of the Honeywell control unless it is used or intended to be used in the Honeywell system." (R. 1229, first paragraph),

and again the Court of Appeals said of the effect of Respondent's conduct:

> "* * * all the conduct of Honeywell which is here complained of has been solely directed toward the protection of the Freeman patent" (R. 1230).

The Court of Appeals thus found that the sale of such a control under the circumstances involved only "the protection of the Freeman patent" (R. 1230, middle) and that such conduct was proper under the Patent Laws (R. 1230).

The Court of Appeals specifically considered

Philad Co. v. Lechler, 107 F. 2d 747,
B. B. Chemical Co. v. Ellis, 314 U. S. 495,
Morton Salt v. Suppiger, 314 U. S. 488,

urged by Petitioner, and also other cases wherein the Courts denied relief on account of improper conduct of the patent owner, and distinguished them (R. 1230 and 1231). In none of the cases considered by the Court of Appeals and in none of the cases now relied upon by Petitioner, were the facts similar to those found by the Court of Appeals here. The Court of Appeals found, as to the cases *there urged:*

> "In all these cases the objectionable conduct was directed toward the sale of something which was not the advance in the art and did not necessarily measure or mark the use covered by the patent." (R. 1231, top).

The Court of Appeals did not disagree with the law as laid down in any of the cases urged by Petitioner. It held that on the facts, Respondent does not come within the principles of law laid down in such cases, but comes within the principle laid down in

> *Leeds & Catlin* v. *Victor*, 213 U. S. 325,
> *Bement* v. *National*, 186 U. S. 70,
> *U. S.* v. *United Shoe Machinery Co.*, 247 U. S. 32,
> *U. S.* v. *United Shoe Machinery Co.*, 258 U. S. 451.
> (R. 1230)

It follows that there is no conflict on the law between the decision below and the decisions of this Court or other Courts. The Court below held that on the facts, Respondent was within its rights under the patent, and that the facts here did not bring this case within the rule laid down in the various cases relating to improper use.

For the protection of the rights of the owner under the patent, this Court has declared that the *public faith is pledged.*

> *Grant* v. *Raymond*, 6 Pet, 218, 241.
> *Continental* v. *Eastern*, 210 U. S. 405.

Under such circumstances there is no ground for certiorari.

Fourth Question.

Violation of the Anti-Trust Laws.

Conflict With Decision of Another Court of Appeal, p. 6, 1. (d) and Unsettled Important Federal Question, p. 7, 3.

Petitioner complains that the Court of Appeals held there was no violation of the Anti-Trust laws by Respondent when it required as a condition to the use of the invention that an unpatented part thereof be purchased from it or its licensees, and that it fixed the selling price of such part by the licensees. Petitioner asserts that this decision conflicts with decisions by the Third Circuit Court of Appeal and involves an important question of Federal law which has not been, but should be, settled by this Court.

Respondent replies that there is no "conflict" and "no unsettled Federal question".

We note that in calling the combination furnace control sold by Respondent and its licensees an "unpatented part", the Petitioner ignores but does not attack the finding of the Court of Appeals below that this control "embodies the essence of Freeman's patent" (R. 1229). There is no dispute that Respondent granted written licenses and in them fixed the prices at which the licensees sell the combination furnace control manufactured by them.

These licenses do not in any manner control the resale prices at which purchasers from the licensees must sell.

Petitioner in its attempt to build up a case under the Anti-Trust laws, refers to a letter, Ex. 20, R. 1051, and states that Respondent required each licensee to sell controls other than the combination furnace control, at fixed prices (p. 30, line 6 from bottom).

There is nothing in the licenses granted or in the letter referred to by Petitioner, which requires the licensees to

do anything whatsoever in respect to standard controls, as distinguished from the licensed combination furnace control that "of course embodies the 'Freeman advance in the art'," (R. 1230).

The Court of Appeals below had before it the full facts as to Respondent's entire conduct, including the licenses and separate letter and stated:

> "This record discloses that the only Honeywell control which gets protection as a result of the licenses is the control usable only for a Freeman type installation which of course embodies the Freeman 'advance in the art'. It further discloses that Honeywell never accused anyone under the Freeman patent on account of the sale of standard controls which might be used with the Freeman installation or might be used with some other installation. So far as we have been able to discover from this record, all the conduct of Honeywell which is here complained of, has been solely directed toward the protection of the Freeman patent. The Patent Laws permit such conduct and the Anti-Trust Laws do not forbid it." (R. 1230).

And again:

> "We find no evidence in this case that Honeywell by its conduct or its license required anyone to buy any element or elements of the patent from its licensees * * *" (R. 1231).

The Issue

So the real question is whether there is any "conflict" or "unsettled Federal question" raised by the decision that the conduct of Respondent does not violate the Anti-Trust laws when that conduct involves giving written licenses and the fixing therein of prices at which the licensees sell the essence of the Freeman patent, and the ultimate sale of such "essence", with an implied license to the purchaser to use it in completing the invention.

It has long been held by this Court that where the conduct of the patent owner is within its rights under the patent there is no violation of the Anti-Trust laws.

Bement & Sons v. *National*, 186 U. S. 70,
U. S. v. *United Shoe Machinery*, 247 U. S. 32 (8),
U. S. v. *General Electric*, 272 U. S. 476 at 494.

In

U. S. v. *General Electric*, 272 U. S. 476,

this Court held that the granting of a license under a patent and the fixing therein of prices at which the licensee shall sell the invention is not a violation of the Anti-Trust laws.

The courts said, at p. 479:

> "The second question in the case involves the validity of a license granted March 1, 1912, * * * to make use and sell lamps * * *. It was charged that the license in effect provided that the Westinghouse Company would follow prices and terms of sale from time to time fixed by the Electric Company and observed by it, and that the Westinghouse Company would, with regard to lamps manufactured by it under the license, adopt and maintain the same conditions of sale as observed by the Electric Company in the distribution of lamps manufactured by it."

and at p. 490:

> "* * * When the patentee licenses another to make vend and retains the right to continue to make and vend on his own account, the price at which his licensee will sell will necessarily affect the price at which he can sell his own patented goods. It would seem entirely reasonable that he should say to the licensee, 'Yes you may make and sell articles under my patent but not so as to destroy the profit that I wish to obtain by making them and selling them myself.' ",

and held at p. 494:

> "For the reasons given, we sustain the validity of the license granted by the Electric Company to the Westinghouse Company. The decree of the District Court dismissing the bill is affirmed."

There is no conflict here with decisions of other Circuit Courts of Appeal because in none of the cases cited by Petitioner was the sole product sold by the patent owner or its licensees that which embodied the essence of the patent.

There is no unsettled Federal question because in

U. S. v. *Univis Lens Co.*, 316 U. S. 241,

this Court, (although it held that certain conduct of the patent owner violated the Anti-Trust laws,) approved conduct almost exactly parallel to that of Respondent here.

It approved a license from the Corporation to the Lens Company (p. 254), which license fixed the prices of the lens blanks manufactured and sold by the licensee (p. 245).

The lens blank thus made and sold was not the complete patented lens (p. 248, bottom), but it

> "embodies essential features of the patented device and is without utility until it is ground and polished as the finished lens of the patent" (p. 249).

The Court said it might assume that the sale thereof would constitute contributory infringement (p. 249).

The sale was

> "a license to practice the final stage of the patent procedure" (p. 249, bottom).

Thus we find that in the *Univis* case, the conduct approved and held to be within the right of the patent owner and held not to be in violation of the Anti-Trust laws, in-

cluded every factor complained of by the Petitioner here. The Corporation licensed the Lens Company and fixed the prices at which the Lens Company sold the product it manufactured under the license. That product was the essence of the patent. The complete invention was not practiced until the purchaser used or finished the product With the purchase, the buyer received the right to complete the invention.

This Court affirmed the lower court in the *Univis* case as to the patentee's right to license others to manufacture an article embodying the essential features of the patented invenion with the patentee fixing the price at which the licensee sold its product. This Court reversed that part of the decree of the lower court dealing with other licensing arrangements by which the ultimate resale price was controlled. The case at bar involves only those facts that this Court approved as within the patentee's right in the *Univis* case.

This Court, therefore, has recently passed upon the exact situation involved in the case at bar and the decision of the Court of Appeals below is in accord with that of this Court.

The decision below therefore involves no unsettled Federal question.

No ground is presented justifying the order for Writ of Certiorari.

Respectfully submitted,

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,

By WILLIAM P. BAIR,

WILL FREEMAN,

Its Attorneys.

(Dated: May 27, 1943.)

IN THE

Supreme Court of The United States

OCTOBER TERM, A. D. 1943.

Nos. 58, 59.

THE MERCOID CORPORATION,
Petitioner,

vs.

MINNEAPOLIS HONEYWELL REGULATOR COMPANY,
Respondent.

BRIEF FOR RESPONDENT, MINNEAPOLIS HONEYWELL REGULATOR COMPANY.

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IN THE

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Nos. 58, 59.

THE MERCOID CORPORATION,

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vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,

Respondent.

BRIEF FOR RESPONDENT, MINNEAPOLIS-HONEYWELL REGULATOR COMPANY.

To the Honorable the Chief Justice and Associate Justices of the Supreme Court of the United States:

Minneapolis-Honeywell Regulator Company, respondent, presents its brief as follows:

Decisions Below.

N. D. Ill., Barnes, J., Memorandum Opinion, R. 1059 (43 F. S. 878); Findings and Conclusions, R. 1065; Final Decree, R. 1070 (46 F. S. 675); Circuit Court of Appeals, Seventh Circuit, Opinion, R. 1225 (133 F. 2d, 811).

(Emphasis herein ours unless otherwise stated.)

Jurisdiction.

This is to all effects and purposes a suit by Minneapolis-Honeywell Regulator Company, hereinafter called Honeywell, against The Mercoid Corporation, hereinafter called Mercoid, for contributory infringement of the Freeman patent No. 1,813,732, Furnace Control, under 28 U. S. C. 41 (7); and involves a request by Mercoid for declaratory judgment under 28 U. S. C. 400.

Mercoid pleaded Honeywell's use of the patent to monopolize unpatented controls, as a bar, and as violation of the anti-trust laws, and asked damages under 15 U. S. C. 15 (not under Section 4 as stated by Mercoid brief, top, p. 4).

Certiorari was sought under 28 U. S. C. 347.

Issues.

We treat the issues in the order followed in Mercoid's brief, p. 4, and not in the order in its Petition for Certiorari, p. 4.

We re-state the issues for the reasons given.

I. Alleged Improper Use of Patent, as a Defense.

The first issue is raised by the claim that Honeywell has improperly used its patent to monopolize an unpatented device. Mercoid's statement of the issue, brief, p. 4, does not accurately define the controversy between the parties, because Mercoid omits reference to the fact upon which the decision turned in the Court of Appeals, namely, that

> "The only Honeywell control which gets protection as a result of the licenses, is the control usable only for a Freeman type installation which of course embodies the Freeman 'advance in the art.'" (Court of Appeals Opinion, R. 1225; p. 1230, line 8.)

We therefore state the first issue as follows:

Honeywell Statement of Issue I.

Has Honeywell improperly used its patent so as to be denied relief when it sells and licenses its competitors to sell "the control usable only for a Freeman type installation which of course embodies the Freeman 'advance in the art,'" and which is less than the complete claim, and carries with it a right to use it for making a complete Freeman system?

II. Alleged Improper Use of Patent as Violation of Anti-Trust Laws.

Mercoid's statement of the second issue is subject to the same criticism, to-wit, that it ignores the fact mentioned, on which the decision turned in the Court of Appeals.

Mercoid's statement is also defective in that it confuses the implied right a purchaser gets when he buys a combination control, with Honeywell's written licenses to competitor manufacturers, which do fix the prices at which the manufacturer-licensees shall sell the controls (called "thermostatic apparatus" in the Freeman claims) made by them and usable only in a Freeman installation.

Mercoid's statement gives the impression that Honeywell attempts to control resale prices of the thermostatic apparatus, usable only in a Freeman installation, after Honeywell or its manufacturer-licensees make the original sale. Honeywell fixes prices at which its manufacturer-licensees may sell, but makes no attempt to fix any prices of the apparatus after it has been initially sold.

We therefore state Issue II as follows:

Honeywell Statement of Issue II.

Does Honeywell violate the anti-trust laws by—

(a) telling a purchaser of a control "usable only for a Freeman type installation" and embodying Freeman's "advance in the art," although less than the complete claim, that he may use the control in completing such installation; and in

(b) granting written licenses to its competitors to manufacture such a control, and

(c) therein fixing the minimum prices at which the competitor-licensee shall initially sell such controls manufactured by it?

III. Contributory Infringement.

Mercoid's statement fails to accurately state the controversy because it omits reference to the following important facts mentioned by the Court of Appeals opinion:

> "With each M-80 Mercoid provides certain wiring diagrams for installation. The accused device has no other use than for accomplishing the sequence of operations of the Freeman patent." (R. 1228, bottom.)

We therefore state Issue III as follows:

Honeywell Statement of Issue III.

Is Mercoid a contributory infringer when it makes and sells a control which has no other use than for accomplishing the sequence of operations of the Freeman patent, which control is less than the full claim of the Freeman patent, and with each control Mercoid furnishes wiring diagrams for installation so that the user inevitably makes a complete embodiment of the claim of the Freeman patent?

IV. Validity.

Mercoid states in effect that the concurrent findings of validity by the Courts below, were wrong, because the patent

> "merely comprises an obvious and unpatentable assembly of non-cooperating parts."

OUTLINE OF ARGUMENT.

Issues I and II. In selling, and licensing its competitors to sell, a combination furnace control "usable only for a Freeman type installation", which control is less than the complete claimed invention, Honeywell's conduct does not bar suit for infringement, nor violate the anti-trust laws.

The Freeman patent claims are for combinations including "thermostatic apparatus responsive to furnace temperature" by which there is brought about a safer and more efficient sequence of operations than before.

Honeywell's conduct complained of involves the exploitation of the Freeman patent by selling and licensing such thermostatic apparatus, commonly called herein a "combination furnace control", which is a single piece of equipment specifically designed and arranged to provide the novel sequence of operations claimed by Freeman. When the combination furnace control is put to its intended and only known use, the Freeman sequence of operation inevitably results.

Honeywell also licenses its competitors to make and sell such combination furnace controls, and in the licenses, fixes the price at which the licensees may sell. Honeywell never fixes the price of the resale of the control. No competitor has been denied a license.

Honeywell has made no attempt to control the sale of other elements going to make up the complete combination.

This conduct of Honeywell is within its rights under the patent law, and is the kind of conduct approved by this Court.

Issue III. Mercoid is a contributory infringer.

Mercoid's conduct consists in manufacturing and selling its combination fan and furnace control, type M-80, which was designed some years after the issue of the Freeman patent, has no use other than in the Freeman system or combination, and is sold by Mercoid with printed wiring diagrams in the form of instructions for installing the M-80 in a furnace to bring about the sequence of operation of the Freeman patent.

This is a tort.

Mercoid's argument that it has not contributorily infringed because the decisions of this Court have done away with contributory infringement is not supported by the opinions of this Court.

This Court found contributory infringement by reason of the sale of an element which was less than the full claim, but embodied the essential features of the patented device, in the *Leeds & Catlin* case, in 1909, and has adhered to that doctrine and decision in 1931, 1938 and 1942.

Issue IV. Validity should not be considered here because it is an ordinary issue of fact, found in favor of the respondent, Honeywell, by concurrent decisions below.

There is no important situation affecting the public.

But, if this Court considers validity, the patent should be sustained on its merits.

The Freeman patent brought about a new sequence of operation in a furnace, whereby more efficient and

safer operation was obtained. The particular elements of the combination therefore did something more than they had previously done outside the Freeman combination.

That Freeman's contribution amounted to invention, is shown by the facts that long prior to Freeman Mercoid—

Was in the business of making and selling controls;

It had in its employ a long-time designer of such controls, McCabe; and the typical man skilled in the art, Black.

Before Freeman, Mercoid tried to combine fan and furnace controls in the same furnace but produced an arrangement lacking the efficiency and safety of Freeman.

The validity of the patent should be sustained.

ARGUMENT.

Issue I. Improper Use.

Issue II. Violation of Anti-Trust Laws.

We note that the Honeywell conduct relied on by Mercoid as a bar to the infringement suit (Mercoid Brief, pp. 12-17) is substantially the same as that relied on as violating the anti-trust laws (Mercoid Brief, pp. 28, 29)

We therefore treat Issues I and II together.

Honeywell's position is that its conduct was within its rights under its patent, and therefore proper under both issues.

The Facts.

A brief resumé may help.

Honeywell and Mercoid are competing manufacturers of

automatic controls used in heating systems. Some of these controls have many uses in many different types of installations. Others are specifically made and especially adapted for only a predetermined and very definite single use. Those involved here are within the latter group.

The Freeman Patent.

The Freeman patent discloses an arrangement where the well-known furnace and fan are operated in accordance with a particular sequence by "thermostatic apparatus responsive to furnace temperature" (Claim 1, R. 1102). That sequence brings about fan operation only after the furnace temperature has attained a predetermined degree; further, that sequence, for safety purposes, both shuts down the burner and maintains continued fan operation when the furnace has reached a high, unsafe temperature.

Thus, if something happens and the furnace gets very hot and the "thermostatic apparatus responsive to furnace temperature" stops the burner, thereby preventing excessive heating of the furnace and a hazardous condition therein, the thermostatic apparatus in stopping the burner does not stop operation of the fan, but continues operation of the fan to remove the excessive heat from the danger zone in the furnace and deliver it to the rooms where it has utility.

This provides a safer and more efficient operation of the furnace located in the basement of your home than was ever heretofore available.

Both Courts below found that Freeman was the first to arrange "thermostatic apparatus responsive to furnace temperature" in such relation to the other old parts of a furnace fan system as to provide that sequence of opera-

tion, whereby combustion is stopped before excessive heat or fire hazard is reached in the furnace and at the same time the fan is continued in operation for delivering the dangerous heat from the furnace to the room (Findings 10-19, R. 1066, and Opinion, R. 1226, third and fourth full pars.).

Mercoid denies that there is a sequence of operation in the Freeman patent. The fallacy in Mercoid's denial is illustrated in Mercoid's statement, brief p. 9, that both switches *may be opened at the same time*. This is not true. The "thermostatic apparatus responsive to furnace temperature" of the claims (called both switches by Mercoid), never permits the fan circuit to be open at the same time that the burner circuit is open.

The Freeman structure is illustrated in simplified drawing, M-H Ex. 13, R. 1043, and the Freeman sequence of operation is shown by M-H Ex. 2 a-g, R. 989-1001. M-H Ex. 2 shows Mercoid's recommended installation of its accused thermostatic apparatus called the M-80.

Honeywell's Conduct.

The conduct of Honeywell complained of by Mercoid has been directed primarily towards the exploitation of "thermostatic apparatus responsive to furnace temperature" which is a single piece of equipment specifically designed and arranged to provide this novel sequence claimed by Freeman. When such unitary "thermostatic apparatus responsive to furnace temperature" is mounted on a furnace and is merely connected by wires to the usual burner and fan thereof, the sequence of operation claimed by Freeman inevitably results.

Incidentally, Honeywell asks only that a similar special single piece of apparatus specifically designed by Mercoid to inevitably bring about when completed by con-

necting it up, the identical sequence claimed by Freeman, be enjoined as contributory infringement.

Mercoid calls its thermostatic apparatus the M-80 "Combination Fan and Limit Control" (R. 1023).

Honeywell Licenses.

Honeywell granted licenses to its competitors under its Freeman patent to manufacture, use and sell thermostatic apparatus which, when sold by such licensees and completed by a user in the only way that a user could complete the thermostatic apparatus, embodied the Freeman invention. Honeywell granted five such licenses (Mercoid Brief, p. 11). Mercoid, a competitor, was likewise offered a similar license (R. 748, A. 29; R. 757, A. 42). Honeywell has never denied a competing manufacturer a similar license.

The written licenses defined the thermostatic apparatus responsive to furnace temperature specifically, so that the structure manufactured and sold by Honeywell's licensees could and would, when completed by the user, bring about only the sequence of operation called for by the Freeman patent (R. 907). Under this definition Honeywell made it certain that what a licensee made and sold, and, incidentally, paid Honeywell a small royalty upon, although an uncompleted part, so embodied the Freeman invention that when completed, would always insure a Freeman sequence of operation.

The structure made and sold by Honeywell, and made and sold by the Honeywell licensees, and, incidentally, made by Mercoid and here charged to infringe, is a thermostatic apparatus in the form of a unitary structure or a single piece of equipment which was not in being prior to the Freeman invention. The unitary structure or single piece of equipment was designed and adapted by each of

them as a direct result of the Freeman invention, so that when that uncompleted structure was put into use in the only way it could be used, there would be a Freeman sequence of operation.

For convenience we will refer to this "thermostatic apparatus" or unitary structure by the name used in the written licenses and in Mercoid's brief, p. 16, first paragraph, as a "Combination Furnace Control."

These facts justify the conclusion by the Court of Appeals that

> "* * * the only Honeywell control which gets protection as a result of the licenses is the control usable only for a Freeman type installation * * *" (R. 1230, line 9).

In view of Mercoid's conceded statement that

> "the real use of the patent clearly is to establish a monopoly in * * * the 'combination furnace control' * * *."

it may be unnecessary to call attention to the fact that Honeywell has never made any attempt to control sales of room thermostats or other standard commercial controls having no necessary relation to the Freeman invention.

Of this the Court of Appeals said:

> "Honeywell never accused anyone under the Freeman patent on account of the sale of standard controls which might be used with the Freeman installation, or might be used with some other installation" (R. 1230, line 13).

Mercoid argues that the control shown by the patentee in the Freeman patent is a conventional control and that Freeman did not invent specific controls.

The trial Court stated in finding of fact No. 27 (R. 1069):

> "The Freeman patent is not a patent on either the fan switch or the limit switch or both of them. It is a patent on a system of furnace control which requires three thermostats for its operation."

The trial Court specifically found that the patent was on

"a system of furnace control."

Honeywell has never contended that the Freeman patent was directed to some specific type of conventional control. Honeywell in fact asserts, and the Court found, that the patent is on a system of furnace control which has been referred to in the record as being a sequence of operations. That sequence, incidentally, is brought about by a thermostatic apparatus also referred to in the licenses as a combination furnace control.

The measure of invention is found in the claims in issue. We quote claim 1 in substantially the same form as it is quoted on page 9 of Mercoid's brief. We have underlined in this claim that portion which Honeywell, its licensees, and Mercoid now make and sell.

> "In a furnace control the combination of apparatus for controlling
>
> the rate of combustion and
>
> the rate of supply of a heat-conducting medium,
>
> thermostatic apparatus responsive to furnace temperature, and
>
> connections between said control apparatus and said thermostatic apparatus by means of which said control apparatus operates to check combustion while supplying said medium when furnace temperature exceeds a predetermined degree."

It will be noted that the thermostatic apparatus of the claim together with its "connections" is so defined as to bring about a particular sequence of operation. It is this sequence of operation that is brought about when Honeywell's licensees make a structure in accordance with the definition of their licenses. It is this sequence that Mercoid brings about when it manufactures and sells its structure known as a "Combination Fan and Limit Control Type M-80."

The underlined portion of claim 1 is the unitary structure sold by Honeywell and made and sold by Honeywell's licensees and made and sold by Mercoid, which, when connected with the well-known furnace and fan thereof, completes a full embodiment of the invention of the Freeman patent as defined in claim 1.

Honeywell's Commercial Combination Furnace Control.

There is attached at the end of this brief, a reproduction of M-H Ex. 17, which is a photograph of the demonstration model, M-H physical Exhibit 15.

In the photograph, there is disclosed the conventional thermostat 18 ordinarily used in a room with electrical connections 28 and 29 leading therefrom. There is also exemplified a heating element entitled "Combustion Accelerator." This represents the ordinary burner or stoker of a furnace. There is also illustrated a fan connection 22, which is for the fan by which circulation of the heated air from the furnace to the rooms is obtained.

The large mechanism between the thermostat 18 and the fan connection 22 is the Honeywell Combination Furnace Control which comprises the thermostatic apparatus of Claim 1 of the Freeman patent. It is this thermostatic apparatus when connected by the electric wires colored red, black, yellow and white in the photograph that always

brings about the sequence of operation, which was new with Freeman, and which is the underlined portion of Claim 1 quoted above.

Mercoid's Commercial Combination Fan and Limit Control—the M-80.

There is also attached at the end of this brief, a reproduction of M-H Ex. 20, which is a photograph of the demonstration model, M-H physical Exhibit 18.

In the photograph, there is disclosed the conventional thermostat 18 ordinarily used in a room with electrical connections 28-29 leading therefrom. There is also exemplified a heating element entitled "Combustion Accelerator." This represents the ordinary burner or stoker of a furnace. There is also illustrated a fan connection 22, which is for the fan by which circulation of the heated air from the furnace to the rooms is obtained.

The large mechanism between the thermostat 18 and the fan connection 22 is the Mercoid Combination Fan and Limit Control, the M-80, which comprises the thermostatic apparatus of Claim 1 of the Freeman patent. It is this thermostatic apparatus when connected by the electric wires colored red, black, yellow and white in the photograph that always brings about the sequence of operation, which was new with Freeman, and which is the underlined portion of Claim 1 quoted above.

Summary as to Honeywell's Conduct.

It is therefore submitted that Honeywell in granting its licenses, in endeavoring to protect its own sales, and in endeavoring to enjoin Mercoid as a contributory infringer, is seeking only to protect for itself that lawful patent monopoly defined in claim 1 of the Freeman patent. Honeywell is not accusing Mercoid as a contributory in-

fringer on account of any conventional or standard controls sold by Mercoid. Honeywell's conduct in bringing suit against Mercoid is on account of Mercoid's manufacture of a thermostatic apparatus for bringing about the Freeman sequence of operation, and what Honeywell endeavors to protect by bringing such suit is its own manufacture of thermostatic apparatus of the kind of which the Court of Appeals said:

> "The only Honeywell control which gets protection as the result of the licenses is the control usable only for a Freeman type of installation, and of course which embodies the Freeman 'advance in the art.'"

Before presenting our argument on the law relating to the sale and licensing of the "combination furnace control" which is an embodiment of the Freeman invention, we call attention to the fact that since Honeywell's monopolizing of the sale of these combination furnace controls is proper under the patent laws, the various detailed acts by which the alleged monopolizing was brought about, are also proper. Honeywell is within its patent rights in monopolizing the sale of "combination furnace controls"; it did not step outside of those rights by licensing others to sell them, or by giving to the ultimate purchaser an implied right to complete a Freeman installation, or by fixing the initial sales prices at which its licensees could sell the embodiment of the invention.

And, we call attention to the fact that there was never any attempt to fix any resale price.

We now proceed to apply the law to the facts.

The Law.

1. The Patent Law Is a Constitutional and Legislative Embodiment of Public Policy.

Grant v. *Raymond*, 6 Peters 218, 241, 8 L. Ed. 376, 384 (1832, Opinion by Marshall).

"To promote the progress of useful arts is the interest and policy of every enlightened Government. It entered into the views of the framers of our Constitution and the power 'to promote the science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries' is among those expressly given to Congress. This subject was among the first which followed the organization of our Government. It was taken up by the first Congress * * * * * * it can not be doubted that the settled purpose of the United States has ever been, and continues to be, to confer on the authors of useful inventions an exclusive right in their inventions for the time mentioned in their patent. It is the reward stipulated for the advantages derived by the public for the exertions of the individual, and it is intended as a stimulus to those exertions. The laws which are passed to give effect to this purpose ought, we think, to be construed in the spirit in which they have been made; and to execute the contract fairly on the part of the United States where the full benefit has been actually received; if this can be done without transcending the intention of the Statute or countenancing acts which are fraudulent or may prove mischievous. The public yields nothing which it has not agreed to yield; it receives all which it has contracted to receive. The full benefit of the discovery after its enjoyment by the discoverer for 14 years is preserved * * *."

E. Bement & Sons v. *National Harrow Co.*, 186 U. S. 70, 22 S. Ct. 747 at 754 (1902).

2. For the Enjoyment of the Owner's Rights Under the Patent, the Public Faith Is Pledged.

Grant v. *Raymond*, 6 Pet. 218, 242, 8 L. Ed. 376 at 384 (1832, Opinion by Marshall).

E. Bement & Sons v. *National Harrow Co.*, 186 U. S. 70, 22 S. Ct. 747 at 755 (1902).

In

Continental v. *Eastern*, 210 U. S. 405, 28 S. Ct. 748 at 754 (1908),

this Court, speaking of the right to exclude others from the use of the patented invention during the time prescribed in the Statute and quoting from *Grant* v. *Raymond*, said:

> "And for his exclusive enjoyment of it during that time the public faith is forever pledged."

3. So Long as He Stays Within His Rights Under the Patent Law, the Patentee May Do What He Pleases With His Patent.

E. Bement & Sons v. *National Harrow Co.*, 186 U. S. 70, 22 S. Ct. 747 at 755.

In

Suppiger v. *Morton Salt*, 117 Fed. (2d) 968, 970, col. 1, bottom,

the Court of Appeals for the Seventh Circuit said:

> "* * * the underlying question in each case is directed to the inquiry as to whether the patentee's activities are within or beyond his domain."

There may be a question as to whether specific acts are within his "domain," but when it is once determined that the activities are within the domain of his patent, his activities are proper.

4. The Anti-Trust Laws Do Not Forbid Contracts Which Are Legitimate Under the Patent Laws.

E. Bement & Sons v. *National Harrow*, 186 U. S. 70, 22 S. Ct. 747 at 756 (1902).

"But that statute" (Sherman Anti-Trust Law) "clearly does not refer to that kind of a restraint of interstate commerce which may arise from reasonable and legal conditions imposed upon the assignee or licensee of a patent by the owner thereof restricting the terms upon which the article may be used, and the price to be demanded therefor. Such a construction of the act, we have no doubt, was never contemplated by its framers."

United States v. *United Shoe Machinery Co.*, 247 U. S. 32, 38 S. Ct. 473 at 482 (First Case).

"Of course, there is restraint in a patent. Its strength is in the restraint, the right to exclude others from the use of the invention, absolutely or on the terms the patentee chooses to impose. This strength is the compensation which the law grants for the exercise of invention. Its exertion within the field covered by the patent law is not an offense against the Anti-Trust Act."

In the above case, the so-called first *Shoe Machinery* case, this Court held that restrictions in a lease of a patented machine, requiring the lessee to purchase supplies from the lessor, were within the patentee's rights and did not violate the anti-trust laws.

The Clayton Law was passed (after the litigation began, but before the date of the decision), forbidding such contracts, and the Government started the second *Shoe Machinery* case.

United Shoe Machinery v. *U. S.*, 258 U. S. 451, 42 S. Ct. 363 (Second Case).

The Government charged that the same kind of "tying" clauses involved in the first *Shoe Machinery* case, violated the Clayton Law. The constitutionality of the Clayton Law was attacked. The Court sustained its constitution-

ality, but in doing so defined its views as to what contracts were within the scope of the patentee's rights and declared that "tying" clauses were not.

This still left the law as it had been, to-wit, that contracts legitimate under the patent law, were not forbidden by the anti-trust laws.

5. Suit for Tortious Taking of the Invention by the Sale of that Which Is Less than the Patented Combination (Contributory Infringement) Is Within the Rights of the Owner Under the Patent Law. Nor Is Such Suit Barred by the Fact that the Accused Article Is Itself Only Part of the Combination.

The earliest case of this kind which we have been able to locate does not even mention the word "contributory."

Wallace v. *Holmes*, Federal Case No. 17,100, 29 Fed. Cases, p. 74, 9 Blatchf. 65 (1871).

This case was decided by the Circuit Court for the District of Connecticut. Suit was brought for an infringement of a patent on a lamp. One defense urged was that the patent was for a combination constituting an improved lamp, and that the defendant made and sold only the burner, which was not the complete claimed invention, but was the "distinguishing feature" thereof.

The Court said:

> "It is quite obvious, that the distinguishing feature of the invention of Collins is the burner. * * * I incline, however, strongly, to the opinion, that the patentee * * * instead of claiming the burner as new * * * has claimed it in combination with a chimney and must stand by his patent under that construction * * * the defendants have * * * sold extensively the burner, leaving the purchaser to supply the chimney without which such burner is useless. They have done this

for the express purpose of assisting, and making profit by assisting, in a gross infringement of the complainant's patent."

The Court said further:

"* * * The defendants have not, perhaps, made an actual pre-arrangement with any particular person to supply the chimney to be added to the burner; but, every sale they make is a proposal to the purchase to do this, and his purchase is a consent with the defendants that he will do it, or cause it to be done. The defendants are, therefore, active parties to the whole infringement, consenting and acting to that end, manufacturing and selling for that purpose. * * * The complainants must have a decree for an injunction and account, as prayed in the bill of complaint."

This case holds that one who makes and sells an element which embodies the real advance in the art, and which when put to its normal use, brings about infringement of a combination claim, is an infringer.

Leeds & Catlin v. *Victor*, 213 U. S. 325, 29 S. Ct. 503, 504, 505 (1909).

This case held that one is an infringer if he makes and sells an element of the combination which

"serves to distinguish the invention,—to mark the advance upon the prior art,"

and this Court has never departed from that rule.

Plaintiff owned a patent on the combination of a reproducing stylus and a disc record. The real improvement in the art was in the record. There was nothing new about the stylus. The Court said:

"It is the disc that serves to distinguish the invention,—to mark the advance upon the prior art."

The defendant made and sold the disc records. When they were put into the use for which they were intended, *i.e.*, with a stylus or needle, there was infringement. Speaking of the finding below, the Court said:

> "* * * And the Court concluded that upon these facts, it was clear that petitioner had 'made and sold a single element of the claim of the Berliner patent with the intent that it should be united to the other element and complete the combination; and this is an infringement.'"

This Court by holding defendant a contributory infringer, enabled plaintiff to protect its sale of records, *the essential or distinguishing part of the invention, even though less than the full claim.*

The Court was not deterred from granting relief because the patent owner was trying to protect its profit in an article not covered by the patent. It was the profit on the disc, technically "unpatented" which Victor was trying to protect.

This Court held that use of the patent to prevent sale by the defendant of an *unpatented* article which was essential to the patented combination was proper.

Putting it another way, the fact that the accused article which was the vitalizing element of the patented combination, was separately unpatented, was not a bar to suit for infringement.

There was no oversight in coming to this conclusion. In the fourth paragraph from the last of the opinion, it appears that the contributory infringer specifically presented the proposition that the disc records were "unpatented articles of commerce." This Court clearly held that if the other facts of the *tort* were found, the defendant could not escape by urging that the accused article was "unpatented" and not the complete invention of the patent.

There never can be contributory infringement except by manufacture or sale of something that is less than the complete claimed invention. Therefore, in every case, when one is charged with contributory infringement, the article so charged is always "unpatented" with respect to the patent in suit. In every case where this Court has sustained contributory infringement, it has in effect said that protection by the patentee can be had against something less than the full claim or that which is "unpatented" with respect to the patent in suit.

6. Recent Decisions by this Court Expressly Approve the Rule Laid Down in the Leeds & Catlin Case.

In

Carbice v. *America*, 283 U. S. 27, 34; 51 S. Ct. 334 at 336,

this Court said:

> "The case at bar is wholly unlike *Leeds & Catlin* v. *Victor*, 213 U. S. 325, 333; 29 S. Ct. 503; 53 L. Ed. 816, on which plaintiff's rely."

In

Leitch v. *Barber*, 302 U. S. 458, 463, 58 S. Ct. 288, 291,

this Court, in speaking of the *Carbice* case, said there was nothing in the *Leeds & Catlin* case that limited the rule laid down in the *Carbice* case.

In

U. S. v. *Univis*, 316 U. S. 241, 62 S. Ct. 1088,

this Court said:

> "We may assume also, as appellees contend, that sale of the blanks by an unlicensed manufacturer to an un-

licensed finisher for their completion would constitute contributory infringement by the seller. *Leeds & Catlin* v. *Victor Talking Machine Co.*, 213 U. S. 325; 332, 333; 29 S. Ct. 503, 505; 53 L. Ed. 816; cf. *Carbice Corp.* v. *American Patents Corp.*, 283 U. S. 27, 34, 51 S. Ct. 334, 336, 75 L. Ed. 819."

This Court has continuously recognized the *Leeds & Catlin* case and has not overruled it.

7. This Court Has Held that There Is No Violation of the Anti-Trust Laws in Licensing the Sale of that Which Is the Essence of, But Less than the Whole Claimed Invention, and in Fixing the Licensees' Sale Price Thereof.

There is no unsettled question as to whether the conduct of Honeywell here complained of violates the anti-trust laws. This Court passed upon a very similar situation last year in

U. S. v. *Univis Lens Co.*, 316 U. S. 241.

In that case, this Court, although it held that certain conduct of the patent owner violated the anti-trust laws, approved other conduct exactly parallel to that complained of here by Mercoid. Mercoid's brief makes no mention of the *Univis* case, which was brought to its attention in our brief opposing certiorari.

In the *Univis* case, the Lens Corporation was the owner of the patents. It licensed

"* * * the Lens Company to manufacture lens blanks and to sell them to designated licensees of the Corporation upon the Lens Company's payment to the Corporation of an agreed royalty of 50¢ a pair" (p. 243).

The Corporation additionally established and carried on a license system under which licensed wholesalers sold lens

blanks to licensed finishing retailers and licensed prescription retailers. The details of this licensing system are not here important. It was held that this additional part of the licensing system violated the anti-trust laws, but the Court specifically excluded from the injunction granted, the Corporation's license to the Lens Company (p. 254). Since that license did not violate the anti-trust laws, it becomes important to review the facts in relation to it.

It was a license to manufacture that which was not the complete invention of the patent, but was of the essence of the invention of one or more of the patents. The situation therefore was exactly like the case at bar.

This Court said the blank

> "* * * is said to conform to the specification and claims of some one of the Corporation's patents" (p. 244),

but we call attention to the fact that the Court also said:

> "And we assume for the present purposes, without deciding, that the patent is not fully practiced until the finishing licensee has ground and polished the blank, so that it will serve its purpose as a lens." (p. 248.)

We note also that the lower Court found that these lens blanks did not in themselves embody the complete invention of any of the patents. (*U. S. v. Univis*, 41 F. S. 258 at 262-263).

But, while the lens blank, which was thus licensed was not the complete patented invention, nevertheless this Court said:

> "* * * each blank, as appellees insist embodies essential features of the patented device and is without utility until it is ground and polished as the finished lens of the patent." (p. 249.)

The approved license fixed prices for sale of the unfinished blanks by the Lens Company (p. 245).

The Court further said it might assume that the sale of such a blank would constitute contributory infringement (p. 249).

Thus we find that in the *Univis* case, the conduct held not to violate the anti-trust laws included every factor complained of by the Petitioner here. The Corporation licensed the Lens Company and fixed the prices at which the Lens Company sold the product it manufactured under the license. That product was not the complete invention of the patent, but it embodied "essential features" thereof. The complete invention was not practiced until the purchaser used or finished the product. With the purchase, the buyer received the right to complete the invention.

We urge that the decision of this Court in the *Univis* case indicates the proper line of division between conduct, which is within the scope of the patentee's rights on the one hand and conduct which goes beyond and violates the anti-trust laws on the other hand.

There is Nothing in Honeywell's Conduct That Bars Relief.

Honeywell's conduct does not violate the anti-trust laws. That is because its conduct is within its rights under the patent laws. Since its conduct is within its rights under the patent laws, suit for infringement is not barred.

The Addition to the Written Licenses by Letter.

Mercoid's brief refers to this letter at p. 15.

The record is not very clear about it. It would seem that after the written licenses were made, some question came up as to what might happen if a licensee sold "separate" controls *"for carrying out the system of the Freeman patent"*.

So, Honeywell wrote the letter to say that in such case the patent would not be asserted if the Separate controls were sold at a combined price of 25¢ more than the "combination control".

The quoted letter in Mercoid's brief, p. 15, reads 25%. This was a clerical error made in 1940 in copying letters written to the licensees in 1939 and then reading 25¢. The error was promptly corrected when discovered. (R. 749, A. 33-34; R. 465; 1051; 1053; 1055; 1057.)

This was a mere incident. It had no effect on the business. There is no evidence that Honeywell or any of its licensees sold "separate" controls for carrying out the Freeman system. Mercoid is not being sued for any such sales of "separate" controls. Two separate controls would obviously cost more than the "combination furnace control". The letter was a mere assurance against a hypothetical case that seemed to bother some one.

We believe it *de minimis*, but if it be deemed important, we respectfully suggest that the Court should inform the parties as to their rights were this letter absent.

SUMMARY AND CONCLUSION UNDER ISSUES I AND II.

Honeywell's Conduct Directed Toward the Exploitation of the Essence of the Patent or Advance in the Art, is Proper. It Does Not Bar Suit by Honeywell Nor Violate the Anti-trust Laws.

The activities of Honeywell in the case at bar are of the kind which were approved in the *Leeds & Catlin* and *Univis* cases.

The particular business which plaintiff sought to protect in *Leeds & Catlin* was the sale of records which embodied the "advance in the art", but were less than the whole combination claimed. The decision gave relief against con-

tributory infringement where both parties were selling these "unpatented articles of commerce".

To be sure, in the *Leeds & Catlin* case, the Court did not particularly mention the conduct of the plaintiff, or its effect on the right to maintain the infringement suit. Yet, it is perfectly clear that the plaintiff's conduct in that case was aimed to keep within the patent monopoly the sale of the disc record which was less than the combination of the patent claim,—an "unpatented" article,—and that this was called to the Court's attention.

And in

Carbice v. *American*, 283 U. S. 27, 51 S. Ct. 334,

when the Court expressly approved the *Leeds & Catlin* decision, the plaintiff's conduct was the very thing in issue. The two sentences in the opinion in the *Carbice* case next preceding the reference to the *Leeds & Catlin* case, read as follows:

> "Relief is denied because the Dry Ice Corporation is attempting without sanction of law, to employ the patent to secure a limited monopoly of unpatented material used in applying the invention. The present attempt is analogous to the use of a patent as an instrument for restraining commerce which was condemned under the Sherman Anti-Trust Law, in *Standard Sanitary Mfg. Co.* v. *U. S.*, 226 U. S. 20; 33 S. Ct. 9; 57 L. Ed. 107." (283 U. S. 27, 33; 51 S. Ct. 334.)

The Court then proceeded to say that the case there was wholly unlike the *Leeds & Catlin* case.

In the *Univis* case, the plaintiff's conduct which was approved was almost exactly analogous to that of Honeywell here.

Distinction Between Proper and Improper Conduct.

Now, what was the distinction between the plaintiff's approved conduct in the *Leeds & Catlin* and the *Univis* cases and the plaintiff's improper conduct in the *Carbice* case?

In each case the plaintiff sought to use its patent to protect its business in an article that was less than the complete combination of the patent claim.

The difference was this: In the former two cases, the article plaintiff sought to control was one which so marked the advance in the art, that its use certainly brought about the use of the patented invention. In the *Carbice* case, the article was "an unpatented material" "long known to the public", which in no wise served to mark the invention. It could be used without practice of the invention. The Dry Ice of the *Carbice* case can be likened to the needles used with the disc records in the *Leeds & Catlin* case or the eye-glass frames of the *Univis* case or the room thermostat in the case at bar.

The "combination furnace control" referred to in the Honeywell licenses, and the M-80 combination control sold by Mercoid, and sought to be enjoined, are controls which are so constructed and marketed that they measure, mark and embody Freeman's "advance in the art."

They are the heart and essence of Freeman's contribution. They are designed, intended and adapted to be used in the Freeman combination and only in the Freeman combination. They are not used or usable anywhere else. They are used for one purpose and that only, namely, the practice of the Freeman invention in a complete heating system.

Each control marks and measures one use of the invention.

When Honeywell is paid a royalty of 25¢ on the sale of a "combination furnace control", it gets 25¢ for one unlimited use of the Freeman invention, and no more.

If a purchaser buys and uses a combination furnace control upon which a modest royalty has already been paid and which control *has no use other than* in the Freeman system, he is required to pay nothing else for the use of the invention, either directly or indirectly.

The licensees pay only on the "combination furnace control" that embodies the "advance in the art".

They are not required by the terms of the license to sell any additional equipment along with the "combination furnace control" or to pay royalty on any additional equipment. If the licensee does sell to the installer any other equipment, any ordinary commercial controls, any room thermostats, the installer is not required to pay royalty thereon, nor is he required to buy such other equipment from the licensee.

The Court of Appeals found:

> "* * * Honeywell never accused anyone under the Freeman patent on account of the sale of standard controls, which might be used with the Freeman installation, or might be used with some other installation." (R. 1230, line 13.)

The installer may use standard room thermostats or other parts or controls, purchased anywhere on the open market. They are the needles of the *Leeds & Catlin* case, the eye-glass frames of the *Univis* case, and the dry ice of the *Carbice* case.

Licenses have been freely issued and one was offered to Mercoid.

The license was a fair use of the patent and within the rights of Honeywell under the patent and under the decisions in the *Leeds & Catlin* and *Univis* cases.

The rule laid down in the *Carbice*, etc. cases was not intended to bar all use of the patent to prevent every sale of an article not technically covered by the patent claims.

This follows from the fact that this Court expressly distinguished the "ordinary" case of contributory infringement as illustrated in the *Leeds & Catlin* decision, from the situation in the *Carbice* case.

How then can the rule in the *Carbice* case be defined and distinguished from the rule of the *Leeds & Catlin* case which the Court specifically preserved when it decided the *Carbice* case, and from the rule in the *Univis* case.

We think the distinction in the two rules can be readily made.

What this Court did was to cast aside distinctions of words or phrases and look at the *meat* of the invention.

If the plaintiff's use of the patent was such that its primary effect was to obtain its profit on the *meat* of the invention and thereby carry out the purpose of the patent law, the use was proper, as in the *Leeds & Catlin* case.

If the plaintiff's use of the patent was such that the *primary* effect was to enable it to control sales of articles which were not of the essence of the thing patented, the use was improper.

As the Second Circuit Court of Appeals said in

Philad v. *Lechler*, 107 F. 2d, 747 at 748 (2d C.C.A.).

> "On contributory infringement the distinction at present is between the case where the owner of a patent exploits it in the ordinary manner and the case where he employs it *primarily* as a means of suppressing competition in unpatented materials used in connection with it."

Again the First Circuit Court of Appeals in

B. B. Chemical Co. v. *Ellis*, 117 F. 2d, 829 at 835,

said in remarkably similar language:

> "* * * the plaintiff is denied relief * * * because it exploits its patent *primarily* as a means of suppressing

competition in unpatented materials used in connection with it."

How then determine whether specific conduct is *primarily* directed toward proper use of the patent or improper use thereof?

This Court has given us one measuring stick. Others may exist, but this one is enough for the present.

If the *thing* which the owner licenses or makes or seeks to enjoin is the

"distinguishing feature of the invention"

as the Connecticut Court found it to be in

Wallace v. *Holmes*, Fed. Case No. 17100,

or

"serves to distinguish the invention,—to mark the advance upon the prior art, * * *"

as this Court found it to do in

Leeds & Catlin v. *Victor*, 213 U. S. 325,

or

"embodies essential features of the patented device and is without utility until it is ground and polished as the finished lens of the patent"

as was stated in

U. S. v. *Univis*, 316 U. S. 241,

then the conduct of the patent owner is primarily directed to proper protection under the patent, and is not a use of the patent

"primarily as a means of suppressing competition in unpatented materials."

Enjoining the sale of the essential part of the invention, to-wit, the discs in the *Leeds* case and the burners in the

Wallace case, and protecting the sale of the blanks in the *Univis* case, had the primary effect of preserving to the patentees the right to exclude others *from the practice of the invention.* It is this right to exclude others from the practice of the invention for a limited time, for which the *public faith has been pledged.*

This Court looked at the facts and it was not hampered by words. It did not matter that the patent owner was thus enabled to control the sale of an "unpatented article", if that article marked the use of the patented invention. The essence of the situation was that the acts of the plaintiff were directed toward and resulted in a reasonable enjoyment of the patent right.

The substantial and primary effect of the patent owner's conduct was to give to the owner what the United States had assured him was his.

That it could be argued in words that the owner thus tended to get a monopoly in unpatented lamp burners, or records, or blanks, this Court knew. But, it did not let words or names obscure the facts; and, the fact was that those burners and those discs and those blanks in each case, marked the "advance in the art". They inseparably marked the use of the invention. When the owner controlled their sale, he controlled that which his patent was presumed to give him,—and no more.

To protect the integrity of the patent grant, it was necessary to permit the owner to enjoin the sale of that which did not in words read on the complete patent claims, *if it necessarily marked the use of the invention.* It embodied something so close to the claimed invention, that each sale was practically certain to lead to one use of the invention. This Court saw that.

The heart of the matter lay in the fact that the total effect of plaintiff's conduct was to protect its patent right against invasion.

Where the plaintiff's conduct was directed toward the protection of its right to the essence of the invention, such conduct did not bar the right to maintain suit for infringement.

This Court has expressly approved the business of selling the essence of the invention. There is no difference in effect between selling it and licensing others to sell it.

This is exactly what Honeywell has done and it asks this Court to protect it here in the same way it protected the patent owners in the *Leeds & Catlin* case and the *Univis* case.

Authorities Relied on by Mercoid Distinguished.

We review the cases relied on by Mercoid.

We have treated above—

Carbice Corp. v. *American Patents*, 283 U. S. 27, 51 S. Ct. 334.

Here the plaintiff was endeavoring, by use of its patent, to control a commodity which could be used in the patented package or which could be used in a thousand and one other non-patented packages. Plaintiff was thus endeavoring to secure for itself the business of supplying Dry Ice, which in no way marked the "advance in the art", or necessarily brought about the use of the invention.

The Court said (p. 336):

> "Relief is denied because the Dry Ice Corporation is attempting, without sanction of law, to employ the patent to secure a limited monopoly of unpatented material used in applying the invention."

Leitch Mfg. Co. v. *Barber Co.*, 302 U. S. 458; 58 S. Ct. 288.

Suit for contributory infringement. The patent was on a method for using bituminous emulsion on the surface of concrete roads to retard evaporation during curing. Bituminous emulsion was a standard article of commerce, long previously known. The patent owner sold emulsion. Defendant sold emulsion knowing it would be used on the patented roads. The Court declared that—

> "* * * the sole purpose to which the patent is put is thereby to suppress competition in the production and sale of staple unpatented material for this use in road building", (p. 289).

and that the rule in the *Carbice* case was applicable. The Court asserted that rule was that

> "* * * every use of a patent as a means of obtaining a limited monopoly of unpatented material, is prohibited" (p. 290).

Here again plaintiff was endeavoring to secure its profit out of the sale of a staple article of commerce, which in no way marked the "advance in the art" or necessarily involved the use of the invention.

> *Morton Salt Company* v. *The G. S. Suppiger Company*, 314 U. S. 488.

The Morton Salt case was the ordinary case of a tying clause requiring lessee of a patented machine to buy ordinary salt from lessor, which practice has long been condemned.

In the *Salt* case the patent owner used its patent, not to control the "advance in the art", but to control the sale of old and well-known salt tablets.

> *B. B. Chemical Co.* v. *Ellis, et al.*, 314 U. S. 495; 62 S. Ct. 406-408; 52 USPQ 33-35.

B. B. Chemical Co. owned a patent on a method of reinforcing insoles for shoes.

The plaintiff used the patent to bring about the sale of something which had no necessary relation to the practice of the patented method.

It is not easy to see from the reports just what was "the advance in the art" involved. It is quite certain that some of the articles sold and leased by the patent owner, and for which it received its compensation, were *not* "the advance in the art".

One of the "materials" which the plaintiff required the purchaser to buy in connection with the implied license, was the adhesive for securing the webbing to the insoles. Of this adhesive the lower Court said:

> "The defendant's latex adhesive is not manufactured by it exclusively for use in the patented process. It is a product manufactured by other concerns and bought and sold in the market." (32 F. S. 690 at 698.)

Certainly then the adhesive sold by the plaintiff was not the "advance in the art".

Also, the machines furnished by the patent owner were not "the advance in the art". It appears from the District Court and the Circuit Court of Appeals reports that they could be used with a "hot" process, which was not the patented process. (32 F. S. 690; 117 F. 2d, 829.)

Thus it was clear that whether or not the pre-coated duck marked the "advance in the art", the *adhesive* and the *machines* did not mark the "advance in the art", and the plaintiff used its patent to get its machines installed and used and to sell its adhesive, and included them in fixing the compensation.

As to them, the plaintiff was using the patent to maintain a limited monopoly in things which were outside the scope of the patent and which did not mark the "advance in the art".

J. C. Ferguson Mfg. Works v. *American Lecithin Co.*, 94 F. 2d, 729 (C.C.A. 1, 1938);
American Lecithin Co. v. *Warfield Co.*, 105 F. 2d, 207 (C.C.A. 7, 1939).

American Lecithin Co. owned a patent on a method of using lecithin in making chocolate candy and on the product. Its business was selling lecithin with an implied license under the patent. The defendant, Ferguson, sold lecithin, knowing it would be used in the patented method. Defendant, Warfield, practiced the method and made the product. Lecithin was an ordinary article of commerce. It had other uses. Its use did not necessarily bring about the practice of the invention.

In the *Lecithin* cases, lecithin was like sugar. Either *could* be used in chocolate candy. Both had other uses. Neither necessarily brought about the practice of the invention. Neither had any necessary connection with the invention.

Philad v. *Lechler*, 107 F. 2d, 747 (C.C.A. 2).

Suit for contributory infringement of a patent on a process for imparting a permanent wave to hair. Philad, owner of the patent, granted 16 licenses, with the agreement that it would not grant more than 18, to manufacturers of hair waving equipment, with authority to sublicense the process to purchasers of equipment. The licenses fixed the prices at which various pieces of equipment might be sold and royalty was based on these prices.

The opinion does not clearly show what the various items of equipment were, but defendants were charged with selling lamps, curling irons, pads and heaters.

It does not appear that any of them embodied the essence of the invention—the "advance in the art", nor that there was a single one, the use of which necessarily brought about the practice of the invention.

Barber Asphalt Corp. v. *LaFera Grecco*, 116 F. 2d, 211 (C.C.A. 3).

The facts varied from those of the *Leitch* case above, but the Court found that the owner's method of doing business was still an attempt to monopolize a staple unpatented material, asphalt emulsion. The use of emulsion in no wise necessarily brought about the practice of the invention.

Sylvania v. *Visking*, 132 F. 2d, 947 (C.C.A. 4, 1943).

Visking owned a patent on pre-printed cellulose sausage casings and the product in which they were used. Visking sold the unprinted casings, which as such, were unpatented articles of commerce, with a license under the patent. The Court, in a very discriminating opinion, held that plaintiff's conduct barred its suit. The case is easily distinguishable.

As sold, the casings could be used with or without the practice of the invention. There was nothing in their character to necessarily bring about the use of the invention.

Novadel-Agene v. *Penn*, 119 F. 2d, 764 (C.C.A. 5, 1941).

This opinion merely contains a general statement (p. 766, second col. [7]), but it does not disclose the nature of the goods sold with a license under the patent, nor whether they were ordinary articles of commerce. The Court did not pass on the propriety of plaintiff's conduct. The decision is not enlightening here.

Barber-Colman Co. v. *National Tool Co.*, 136 F. 2d, 339; (C. C. A. 6, 1943).

The Court held that the owner of patents on a process of grinding and a machine for operation in conjunction with

the process could not, in a license, fix the selling price of an old product ground by the particular process and machine.

Ethyl Gasoline Corp. v. *U. S.* 309 U. S. 436, 456.

On p. 30 of its brief Mercoid quotes from the opinion in the *Ethyl* case. There is not a single word of evidence in the case at bar of any attempt to

> "* * * tie to the use of the patented device * * * the use of other devices, processes or materials * * *",

as mentioned in the *Ethyl* opinion. Honeywell's sale of the heart of the Freeman invention with a right to use it in a Freeman installation, is not such tying.

Radio Corp. of America v. *Lord, et al.* 28 F. 2d, 257 (C.C.A. 3, 1928).

This case is readily distinguishable on the facts. The contract involved was for the sale of merchandise on condition that the purchaser should not deal in the goods of a competitor (p. 259, col. 2, first full par.), and the question was whether it violated Sec. 3 of the Clayton Law.

No comparable facts are here involved.

Sola Electric Co. v. *Jefferson Electric Co.*, 317 U. S. 173.

The *Sola* case has no pertinence here. That case held that a licensee may assert the illegality of a price fixing license agreement and may offer any competent evidence to establish its illegality including proof of the invalidity of the patent.

It is clear that this case does not here apply since there is no agreement whatsoever between Honeywell and Mercoid.

III. Contributory Infringement. Mercoid Is a Contributory Infringer.

In this case, all of the elements of contributory infringement as that tort has heretofore been considered, are present.

Mercoid makes and sells the M-80 (Finding 7, R. 1066). It furnishes instructions in the form of illustrative wiring diagrams showing how the M-80 should be installed in a furnace. Bulletin L-4 (M-H Ex. 1-A, R. 985-6) shows in Illustration 7 and Illustration 8, Mercoid's recommended mode of installation. Mercoid's Bulletin M-12 (Mercoid's Ex. CC, R. 859) shows duplicates of Illustrations 7 and 8. The recommended installation of Illustration No. 7 is also found in Mercoid's booklet, M-H Ex. 10, (physical), Diagram No. 2403, and in Mercoid's booklet, M-H Ex. 11 (physical), Diagrams 2407, 2408, 2409 and 2410 (Finding 25, R. 1069).

Illustrations 7 and 8 were sent out by Mercoid with all M-80's, and the District Court found that when the M-80 is used as thus recommended, Mercoid is a contributory infringer. (Findings 22 and 24, R. 1069.)

M-H's Ex. 2 a-g (R. 989 ff) and M-H Ex. 3 a-g (R. 1005 ff) show the sequence of operation when the M-80 is used according to Mercoid's recommended Illustrations 7 and 8.

McCabe, a director of Mercoid, conceded that the Freeman sequence is brought about by these arrangements (R. 598-608).

Black, Mercoid's expert, agreed that Claims 1, 4, 6 and 9 read on the installations made according to Mercoid's recommendations (R. 269-270).

Mercoid concedes that when the M-80 is installed by the purchaser, the Freeman patent is infringed. (Petitioner's Reply to Respondent's Brief, dated June 1, 1943, p. 4, line 7).

Mercoid in its literature recommends no other use for the M-80. There is no other use.

Here are all of the elements of a tort. Mercoid sells a specifically designed control, which has only one use known to this record,—to-wit, to bring about the use of the Freeman invention. Mercoid first produced this control in 1937 (R. 18, ans. to interog. 1) (6 years after the issue of the Freeman patent) for the sole purpose of bringing about one use of the Freeman invention when one M-80 was installed. Mercoid is not content with manufacturing the M-80 which has only this one use, but with each M-80 sold, it furnishes specific wiring diagrams informing the buyer how to use its M-80 in the only way that it can be used, to-wit, for bringing about the Freeman invention. Here is a purposeful taking of Honeywell's patent property.

It is contributory infringement unless this Court has done away with the doctrine of contributory infringement.

Mercoid's Accused M-80 Has Only the Freeman Use.

We note—

> Mercoid's argument that the Court of Appeals was wrong in the Finding (R. 1228) that the accused M-80 has no other use than for accomplishing the sequence of operations of the Freeman patent. (Mercoid's Br. p. 34.)

The argument may be summarized thus:

> Mercoid has sold fan switches and limit switches since prior to 1925. They were used for other than Freeman purposes. Honeywell has asserted their use involves the Freeman patent. Honeywell asserts the M-80 is the equivalent of the switches of the Freeman patent. Therefore the M-80 can be used for other purposes, and the Court of Appeals was wrong.

Mercoid's reasoning is faulty—

first, because it implies, but does not dare say, Honey-

well has asserted that the M-80 is the equivalent of these early fan and limit switches. Honeywell denies that.

These early switches were, we assume, sold by Mercoid, (Mercoid's brief p. 34 refers to R. 141). There Black, Mercoid's expert and engineering department employee, attempted to show how close these early switches were to the switches in the Freeman patent.

Black would not say they had ever been connected by Mercoid to get the Freeman arrangement and result. But he tried to point out various "similarities" and leave the impression that Mercoid had the Freeman invention. He even showed an early Mercoid "wiring diagram", Drawing No. 266, of Sept. 27, 1927. (R. 151, top.)

After twelve pages of direct testimony relating to these "similarities" the District Court took him in hand with respect to differences in sequence of operation and finally counsel for Mercoid admitted that there was a difference in sequence of operation between drawing 266 and Freeman. (R. 155.)

All the Mercoid system lacked was the heart of the Freeman arrangement. It had separate controls that might have been wired to accomplish the Freeman system, but were not.

Mercoid now argues that these switches could be used for other than Freeman purposes. It asserts it has put them into the unitary M-80 and so the M-80 is likewise usable for such other purposes.

What Mercoid neglects to tell the Court is that *now*, after learning from Freeman, Mercoid wires the switches in the M-80, *not* according to Mercoid's old scheme, but according to Freeman. And it does this by "permanent internal wiring" so that the old sequential operation is *impossible*. Only the one Freeman arrangement is possible. (See Ex. PPP.)

And, when it is "hooked up" the only way it can be hooked up as it comes from Mercoid's factory, it brings about the Freeman installation.

The Court of Appeals was right in its finding that the M-80 has no other than a Freeman patent use.

We call attention to Mercoid's argument, brief, p. 17, bottom. This argument is to the effect that if Honeywell shall be permitted to use its patent to protect its sale of its combination furnace control, all manufacturers will be limited in the sale of their old articles whenever a new system patent issues. This argument is not sound. It is fallacious because no new system patent can prevent the manufacturer from selling for all the purposes known to him before such patent issued. Such manufacturer is demanufacturer from selling for all the purposes known to prived of nothing he had before. How fallacious is this statement is made clear if it be followed to its ultimate conclusion.

By "system patent" we understand Mercoid to mean patents with combination claims. If such patents are refused protection because they employ old elements, every direct infringer would be free from liability and such patents would have no value whatever, because they could not be enforced against any kind of infringement.

Furthermore, we mention this argument of Mercoid's at this point to show how inapt it is when applied to the facts in the case at bar. So far as its application to Mercoid is concerned, Honeywell has made no attempt to prevent Mercoid from selling the controls it was merchandising prior to Freeman. The only article accused by Honeywell in this case is Mercoid's M-80 which was not exploited by Mercoid until six years after the issue of the Freeman patent.

The Basis of Mercoid's Denial of Contributory Infringement, Is That the Decisions of This Court Have Done Away With Contributory Infringement.

The claims are combination claims. Mercoid does not sell the whole combination, but only the M-80, which is a part only of the combination.

Mercoid argues that the effect of recent decisions of this Court is that there cannot "legally" be contributory infringement under such facts. (Petitioner's Reply to Respondent's Brief, dated July 1, 1943, p. 4, second full par.).

Contributory Infringement Is Still a Tort.

It is Honeywell's position in this case that this Court has specifically preserved the doctrine of contributory infringement in those very cases in which the Court has refused relief to a plaintiff who improperly used his patent. The Circuit Court for the District of Connecticut stated the basis for the doctrine of contributory infringement without mentioning "contributory", in 1871, in

> *Wallace* v. *Holmes*, Fed. Case 17100, 29 Fed. Cases, p. 74, (1871).

The Collins patent was on a lamp with a burner and a chimney. The defendants sold a specific burner containing all of the improvement of the patent except the chimney. When that burner was used, it was always used with a chimney. When the user put the chimney on the burner and used it, he became an infringer. The Court held that the defendants in making and selling the burners

> "are, therefore, active parties to the whole infringement, consenting and acting to that end, manufacturing and selling for that purpose."

And, as we read the cases, this Court, has never changed the rule of law there laid down.

In the classic case of

Leeds & Catlin v. *Victor*, 213 U. S. 325; 29 S. Ct. 503 (1909),

this Court held that a defendant who made and sold the disc, which was one element of the patented combination with the knowledge and implied intent that it should be used in the patented combination, was an infringer.

We maintain that this Court has not as yet changed its position taken in that case.

In

Carbice v. *American*, 283 U. S. 27 at 34; 51 S. Ct. 334 (1931),

this Court said:

> "The case at bar is wholly unlike *Leeds & Catlin* v. *Victor*, 213 U. S. 325, 333; 29 S. Ct. 503; 53 L. Ed. 816, on which plaintiffs rely. That was an ordinary case of contributory infringement."

Again in

Leitch v. *Barber*, 302 U. S. 458, 463; 58 S. Ct. 288, 291 (1938),

this Court in speaking of the *Carbice* case said that nothing in the *Leeds & Catlin* case limited the rule laid down in the *Carbice* case. Clearly this Court was recognizing and distinguishing the rule in the *Leeds & Catlin* case, and was not purporting to overrule it.

In

U. S. v. *Univis Lens Co.*, 316 U. S. 241 at 249; 62 S. Ct. 1088 (1942),

this Court said:

> "We may assume also, as appellees contend, that sale of the blanks by an unlicensed manufacturer to an unlicensed finisher for their completion would constitute contributory infringement by the seller."

This clearly shows that the Court has not done away with the doctrine of contributory infringement.

Mercoid, having taken the advance in the art, of the Freeman patent and built a control for bringing about the Freeman sequence of operation, is an infringer under authority of this Court's decisions in the *Leeds & Catlin* case, *supra*, and the recent *Univis* case, *supra*.

IV. Validity.

Validity is urged by petitioner as an issue before the Court.

This Court has not said whether or not it would consider the issue of validity.

We respectfully submit that under the circumstances of this case, the Court should not entertain that issue.

(a) *Validity Is an Ordinary Issue of Fact.*

Whether or not the patent is valid as for an invention, is a fact determinable upon all the available circumstances.

Whether the patentee took that step which arises to the dignity of invention is a fact to be determined after full consideration of all the facts including the art as it was, the particular step in advance, and the effect of the patent on the art.

Judge Barnes in the District Court considered prior patents, alleged publications and alleged prior uses (R. 1062 and R. 1067), heard the experts on both sides, and came to the conclusion that Freeman—"discloses invention over the prior art and that it is valid".

The Court of Appeals "approved". (R. 1227, top).

There was a great deal of testimony introduced by both sides relating to the existence of invention and the validity of the patent itself.

The situation here is not at all like that in

Market Street Railway Co. v. *Rowley*, 155 U. S. 621 at 625,

cited by Petitioner in its Reply to Respondent's Brief. There the issue was whether the Court below erred in refusing to instruct the jury that the patent was void for want of novelty. The defendant had offered a group of prior patents, with no extrinsic evidence. This Court held that under such circumstances the lower Court should have instructed as requested. We have no such situation in the case at bar. In the present case, both parties put on experts, and much other oral evidence and, Judge Barnes, after hearing all of the witnesses, found as a fact, that the patent was a meritorious contribution and disclosed invention.

As far as validity is concerned, we have here an ordinary patent case. There is no novel question of law.

This Court has long followed the practice of refusing to grant certiorari to review such cases.

Mercoid agrees with the findings of the trial Court that no single prior patent or publication or proved installation shows the Freeman arrangement.

So Mercoid argues that the issue of validity is one of law. (Mercoid brief, p. 41, middle.) We respectfully urge that under the decisions of this Court, validity is a question of fact. See

Continental v. *Eastern*, 210 U. S. 405, 416 (1908),

The United States v. *Robert Esnault-Pelterie*, 299 U. S. 201; 57 S. Ct. 159-205.

"Validity and infringement are ultimate facts upon which depends the question of liability."

Because validity is a question of fact decided by the District Court after hearing all the witnesses and the evidence, and affirmed by the Court of Appeals as a finding that

"could not have well been otherwise under the evidence presented" (R. 1227),

we submit that there is no question of law for consideration by this Court.

(*b*) *Concurrent Decisions Below Sustained Validity.*

Furthermore, we have a situation where the Courts below concurrently agree on the fact of invention. This Court will not ordinarily disturb concurrent findings of the Courts below, where there is evidence to support them.

Williams Mfg. Co. v. *United Shoe Machinery Corp.*, 316 U. S. 364 at 367.

Continental Paper Bag Co. v. *Eastern Paper Bag Co.*, 210 U. S. 405, 416; 28 S. Ct. 748, 750 (1908).

"The lower Courts therefore found that the invention was a broad one, and that the machine used by the Continental Company was an infringement and these are questions of fact upon which, both of the Courts concurring in their findings, will not be disturbed, unless clearly wrong."

There is ample evidence to support the Findings below. There is nothing peculiar in this case to take it out of the general rule.

(c) *There Is No Important Situation Affecting the Public.*

There is no evidence that the situation here is one peculiarly requiring the Court to interfere to protect the public. Mercoid acknowledges that Honeywell granted licenses to its competitors. (Mercoid's brief, p. 11.) It is acknowledged also that Honeywell offered a license to Mercoid.

Royalty in the written licenses is 25¢ (R. 908). The highest price fixed on the combination control (R. 913) is a minor factor in the cost of installing a furnace with a Freeman control system. Mercoid's prices for the M-80 have been very close to the prices charged by Honeywell for the combination furnace control (Mercoid prices, R. 767, 775, 783; Honeywell prices, R. 913). Thus Honeywell's unlicensed competitor was selling at practically the same prices as was Honeywell. No burden was put upon the furnace installer or user. The ultimate consumer had a wide choice of sources of supply.

There is no important public question.

(d) *On the Merits, the Patent Should Be Sustained.*

As already shown, Mercoid agrees with the finding that nowhere in the prior art is there shown the particular arrangement and sequence of the Freeman patent.

Both Courts below found the contribution of Freeman to be meritorious and invention, and held the patent valid.

Mercoid concedes Freeman arrangement was new to the art. (Mercoid Brief, p. 41, middle), *but Mercoid says old arrangements could be modified to make Freeman—and without invention, because the parts perform their old functions.*

The heart of Mercoid's attack may be stated thus. Mercoid says that it was old to use a limit switch in *a* circuit

in one furnace as illustrated by Mercoid's Ex. U, Bulletin D of 1924, (R. 797), (Mercoid brief, p. 42, par 2), and, that it was old to use a fan and a fan switch in *another circuit* in another furnace, as illustrated by Mercoid's Bulletin A-5, June 1930, Mercoid Ex. AA (R. 841, Illustration 4) (Brief, p. 43, first par.). Mercoid makes no pretense of saying they were ever combined in one furnace as Freeman combined them so as to get the Freeman result and the Freeman sequence of operation. Mercoid says it was no invention to take the old fan switch and the old limit switch, arranged in different furnaces in wholly disconnected circuits, put them into one furnace system, so connected and associated as to get the new sequence of Freeman, and the reason it was no invention was that the fan control and the limit control "each continued to perform the function which it previously performed in other connections."

We reply:

First: that when Freeman put the elements together, the combination produced a new and valuable result in furnace operation.

Second: that when Mercoid tried, it failed to get Freeman, although it had every facility.

When a user employed the limit switch of Mercoid Ex. U, Bulletin D, he did not get the Freeman sequence, because he had no fan.

When he used the fan switch arrangement of Mercoid Ex. AA, Bulletin A-5, he did not get the Freeman sequence because he did not have any limit (safety switch). But, when they were used together, as taught for the first time by Freeman, with such settings and wirings as to get the Freeman sequence, the user had a better and safer furnace than before.

It has been held in many cases that there may be invention in combining old elements to get a new and improved result.

> *Ottumwa Box Car Loader Co.* v. *Christy*, 215 F. 362, 369, (C. C. A. 8, 1914).

Since the new result exists, the defense that there is no invention, because the parts perform their old functions, falls.

When Mercoid Tried, It Did Not Get Freeman.

Mercoid constantly departs from its assertion that it asks no retrial of the facts (Brief p. 41) and attacks validity by urging lack of invention (Mercoid brief, p. 47). That is the reason it argues the Portner drawing.

So, let us consider what Mercoid did when it was faced with the problem of putting together the circuits which it now contends can be put together without invention to make Freeman.

The Mercoid Corporation, although in the business of furnishing fan controls and limit controls, and although having at its beck and call McCabe, who has for many years been an expert designing controls for use in heating systems. (R. 623) *and also Black, acknowledged by Mercoid's counsel to be the typical man skilled in the art as early as* 1927 (R. 156), *never conceived the idea of putting the old controls into a furnace system so as to get the sequence of operation and advantages of the Freeman system.* Mercoid says it was making limit switches and fan controls as far back as 1924, (R. 595). But, when Mercoid was requested during the trial to show its own suggestions to the world as to how a furnace control system should be installed, the best it could dig up was the 1927 drawing (R. 150-151).

Mercoid Ex. XX showed an arrangement differing from Freeman and lacking the Freeman sequence of operations, and in which, when the limit switch shut down the furnace, it shut down everything and left the dangerous condition in the furnace. That was the best Mercoid could do in its years of experience with the aid of McCabe, the genius, and Black, the man skilled in the art.

The history of Mercoid's use of fan and limit switches refutes Mercoid's present contentions and shows that it was not obvious to those skilled in the industry, to bring about Freeman sequence.

Portner Sketch.

Mercoid says it was not hard to conceive of the Freeman arrangement. In support of that argument it produced the Portner sketch, (Mercoid brief, p. 49), which it says was sent to Mercoid in 1928. Mercoid does not assert this as a publication. It was a mere private drawing. It does not show prior knowledge of the kind which, under the statute, bars a patent. That knowledge must be of something more than a private drawing.

Block v. *Nathan Anklet Support*, 9 F. 2d, 311, 312 (C. C. A. 2, 1925)

But, Mercoid's argument is that the Portner drawing shows that one skilled in the art would conceive of the Freeman arrangement.

Now let us see what effect this Portner drawing had on Mercoid and its men skilled in the art. None.

This Portner drawing gathered dust in the limbo of forgotten things. *And, Mercoid continued to recommend to the public its former arrangement of limit and fan controls for obtaining a sequence entirely different from that of Freeman.* (Ex. Y, 1929), Drawing 748, R. 829 and Ex. AA (June, 1930) R. 841.

Every self-interest pointed in the direction of getting the Freeman advantage. Even after the Portner drawing was thrust in front of Mercoid, Mercoid did not do the thing which it now says is obvious. It did nothing. It continued to advertise its old scheme. That shows Freeman was not obvious to those in the industry.

Mercoid's own history showing that able members of the industry failed to see the Freeman arrangement, even when working with all the separate elements of the Freeman combination, shows that Freeman made an invention and that the patent is valid against the attack made by Mercoid.

The Record Shows that Mercoid Was Not Recommending the Freeman Sequence Before the Freeman Patent.

Mercoid calls attention to certain correspondence (Mercoid brief, p. 47-48) and says that this correspondence shows that Mercoid was sending "instructions" for the Freeman type of installation prior to the date of the Freeman application.

In the first place, Mercoid's statement is not supported by the facts. These letters referred to do not disclose instructions for the Freeman system—they disclose instructions which are consistent with the sequence recommended by Mercoid in its 1927 drawing No. 226, Mercoid's Ex. XX, hereinbefore referred to.

The letter to Miller (R. 941) clearly shows that the limit control was recommended "in order to protect the fan control". This would mean that Mercoid was recommending its old arrangement of Ex. XX.

In December 1927 Mercoid sent a catalog to Socony Burner Corp. Mercoid did not produce the catalog.

But we know that after these letters, which Mercoid now says taught the Freeman arrangement Mercoid continued in its catalog publications, as distinguished from its private

writings, to show the arrangement of Ex. XX. See drawing of 1929, No. 748, R. 829 and Ex. AA, 1930, R. 841. Mercoid's present assertions are not borne out by its own history.

Second, on this point we call attention to the fact that the statement in Mercoid's brief, p. 49 top, confuses the indefinite instructions in the letters with the *positive* instructions sent out with the M-80, in two respects. It implies they are the same, which is not true; and it implies that the Court of Appeals considered both sets of instructions in finding contributory infringement, which is not true. The Court of Appeals was considering only the instructions sent out with the M-80 (R. 1228, bottom).

The record shows that Mercoid never sent out instructions for the installation of the Freeman sequence prior to the Freeman application.

CONCLUSION.

We respectfully urge that the conduct of Honeywell has not been improper so as to bar suit for infringement, or violate the anti-trust laws, because it involved exploitation of what was essential to the Freeman invention and nothing else, and this conduct is within its patent rights.

Mercoid's conduct is that of a tort feasor and the doctrine of contributory infringement (constituting tort) still stands.

The patent was sustained by both Courts below, there is no new question, no question of law, no factor seriously affecting the public, here involved, and this Court should not take the case to pass on validity; but, if it does, the patent is valid as involving a meritorious invention, which those skilled in the art failed to create, even though all the ingredients were thrust before them.

The Court of Appeals should be affirmed.

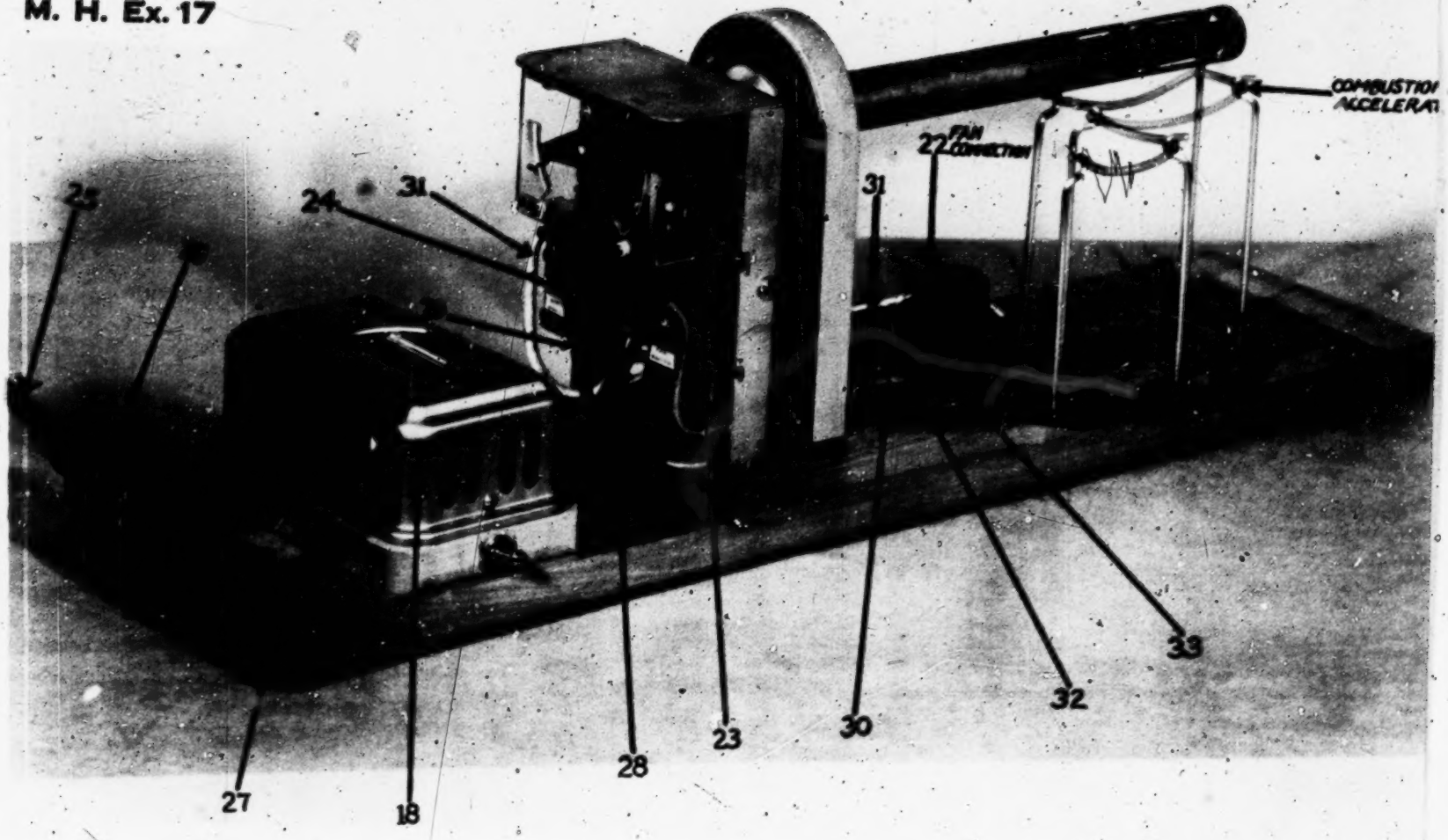
Respectfully submitted,

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
By BAIR & FREEMAN,
Its Attorneys.

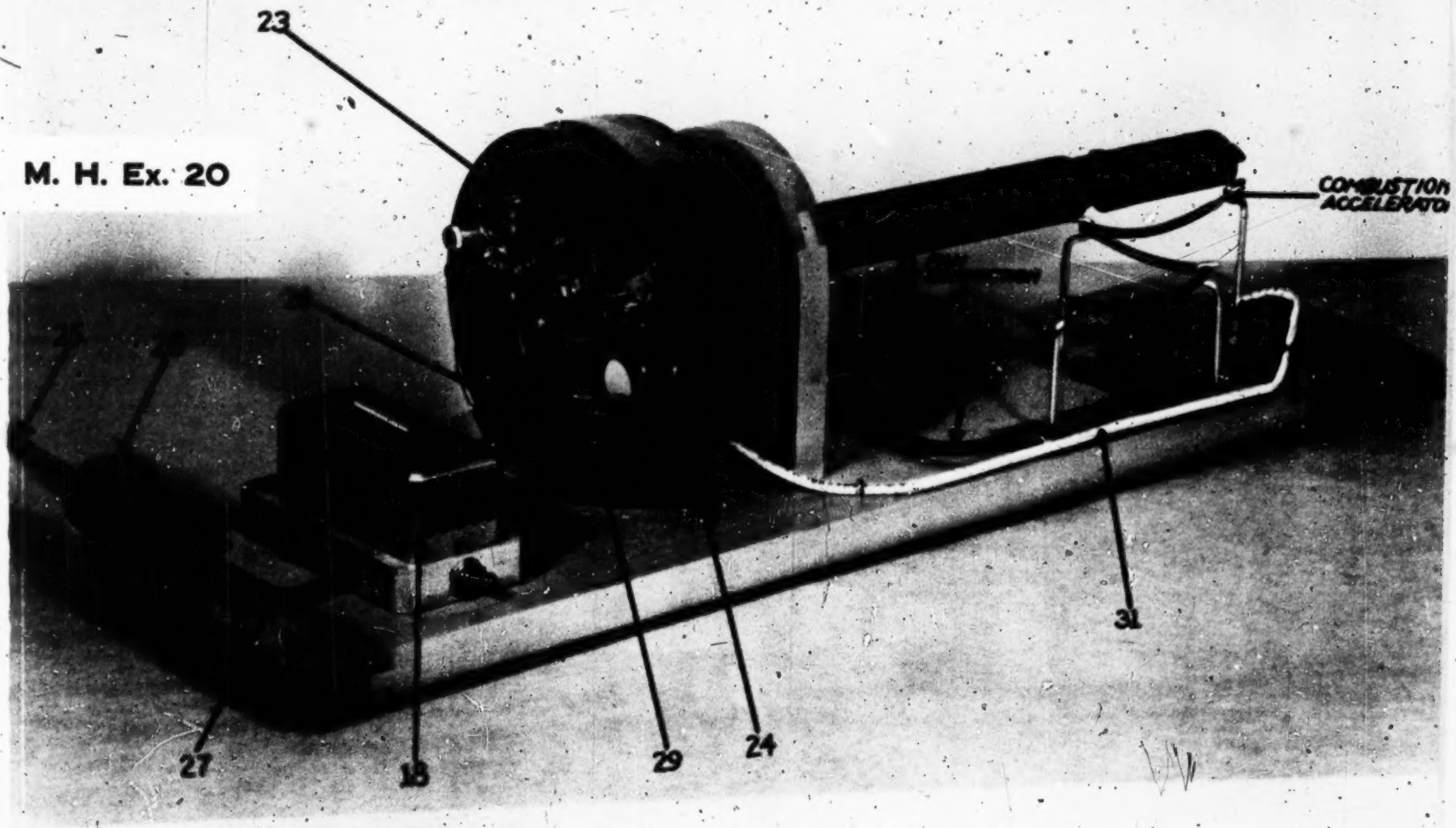
W. P. BAIR,
WILL FREEMAN,
GEORGE H. FISHER,
Of Counsel.

(October 14, 1943.)

M. H. Ex. 17


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FAN CONNECTION
COMBUSTION ACCELERA
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M. H. Ex. 20



IN THE

Supreme Court of The United States

OCTOBER TERM, A. D. 1943.

THE MERCOID CORPORATION,
Petitioner,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Respondent.

Nos. 58, 59.

PETITION FOR REHEARING.
BRIEF ON PETITION FOR REHEARING.
MOTION TO STAY MANDATE.

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MC CORNICK AND HENDERSON, INC

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Nos. 58, 59.

PETITION FOR REHEARING.

Re Opinion Rendered January 3, 1944.

To the Honorable, the Chief Justice of the United States, and the Associate Justices of the Supreme Court of the United States:

COMES NOW, Respondent, Minneapolis-Honeywell Regulator Company, and respectfully petitions for a rehearing on the grounds:

That the decision of January 3, 1944,

(1) discriminates between owners of patents in that the owner who does nothing with the invention, is afforded relief not afforded one who gives the invention to the world, but sells only part of the patented combination;

(2) puts certain conduct of an accused infringer within the patent right, and puts the same conduct of a patent owner outside the patent right.

These inequitable rules stem from failure of this Court to apply a principle equally fair to the public and the patent

system, a principle that should have been applied, and which would make the propriety of the conduct of the patent owner depend on whether it was primarily and in effect directed toward and resulted in reasonable exploitation of the patent right.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY.

By BAIR & FREEMAN,
135 South LaSalle Street,
Chicago 3, Illinois,
Its Attorneys.

W. P. BAIR,

.....

WILL FREEMAN,
GEORGE H. FISHER,
Of Counsel.

(Dated: January 25, 1944.)

CERTIFICATE OF COUNSEL.

I hereby certify that the foregoing Petition for Rehearing is presented in good faith and not for the purpose of delay.

.....
Of Counsel for Respondent.

BRIEF IN SUPPORT OF PETITION FOR REHEARING.

The decision brings about two inequitable results.

I. It discriminates between owners of patents in that the owner who does nothing with the invention and thereby withholds its benefits from the public, is afforded relief, whereas relief is not afforded one who gives the invention to the world by selling the essential part of the patented combination.

This is true because under the doctrine of the decision, a patent owner who does nothing by way of making or selling or using, to give the invention to the world, may have relief for infringement.

But, the owner who gives the invention to the world, who exploits, advertises and promotes it, and who actively extends the availability of the invention to the public at large by selling or licensing others to sell the singular element which has its inevitable destiny in the patented combination, and where the only relief asked for is to prevent the sale by others of such an article that has no place in commerce except in a channel that leads inevitably to a violation of the patentee's rights, may have no relief for infringement.

It is an inequitable rule that leads to such a result.

II. It puts certain conduct of an accused infringer within the patent right, and puts the same conduct of a patent owner outside the patent right.

This is true because under the doctrine of the decision, the accused who wilfully and knowingly sells that which will inevitably bring about the complete infringement and nothing else, is a contributory infringer. His conduct therefore trespasses within the scope of the patent right and is wrongful only because that right is violated.

But the patent owner, who does exactly the same thing, is held to act beyond the scope of the patent right.

Where the owner, who has done nothing with his patent, enjoins the contributory infringer who has been giving the world the invention, then desires to permit the infringer to continue to give the world the invention, and licenses him to do that which he has been enjoined from doing, the owner steps outside the patent right and becomes a violator of the anti-trust laws. That was the position of Mid-Continent in the companion case. The ultimate effect is that the owner who is not in a position to make and sell the invention has no right as against the contributory infringer, unless he withholds the invention from the world.

Let us follow this point a little farther.

This Court, on page 4 of its opinion, rests its decision on the decision in the companion case, *Mercoid* v. *Mid-Continent Investment Company*, and on the same page of the opinion, this Court speaks of

> "* * * this unpatented device * * *."

This *unpatented device* as made by Mercoid and as made by Honeywell is shown in Honeywell's Exhibits 20 and 17 on the last two pages of Honeywell's main brief.

In the *Mid-Continent* case this Court, on page 6 of its opinion, said of "this unpatented device":

> "* * * though we assume for the purposes of this case that Mercoid was a contributory infringer and that respondents could have enjoined the infringement had they not misused the patent for the purpose of monopolizing unpatented material."

Thus that conduct which the Court says constitutes an infringement, which must bring it within the scope of the patent, is according to the same opinion, when done by the other litigant, a violation of the anti-trust laws.

The conclusion reached by this Court means that the sale of a device (by Honeywell in this case) is not within the protection of the patent, whereas the sale of a similar device (by Mercoid in this case) is a violation of the patent right.

It also means that the owner of a patent who keeps a patent in a vault and out of the reach of the public, can come into this Court, obtain its protection and enjoin Mercoid. When that same owner, who does nothing with his patent gets an injunction and thereafter licenses the litigant who has been enjoined, he becomes guilty of misuse of the patent and a violator of the anti-trust laws.

And if Mercoid having taken the license, had then refused to pay the royalties in accordance with the license agreement, it could have defended against a suit for the payment of the royalties on the ground that Honeywell had violated the anti-trust laws by giving the license to do that which the Court had enjoined.

It is an inequitable and illogical rule that brings about such a result.

We respectfully call this Court's attention to its decision in the case of

United States v. *Univis Lens Company*, 316 U. S. 241,

decided as recently as May 11, 1942.

One of the questions there decided was whether the conduct of the Univis Corporation was under the patent, and therefore excluded from the operation of the Sherman Act. This Court there stated specifically that question as follows (p. 243):

> "The principal questions for decision are:
>
> First: Whether the system established and maintained by the Univis Corporation, appellee and cross

appellant, for licensing the manufacture and sale of patented multifocal eyeglass lenses is excluded by the patent monopoly from the operation of the Sherman Act."

The original lens blank sold by the licensee company with price control did not answer to the full claim of the patent. It was not complete. It therefore did not infringe. The Court said (p. 248):

"And we assume for present purposes, without deciding, that the patent is not fully practiced until the finishing licensee has ground and polished the blank so that it will serve its purpose as a lens."

The Court further said (p. 249):

"We may assume also, as appellees contend, that the sale of the blanks by an unlicensed manufacturer to an unlicensed finisher for their completion, would constitute contributory infringement by the seller."

It was upon these facts assumed by the Court, that this Court found that the license from the Lens Corporation under which the Lens Company manufactured lens blanks (which were less than the complete patent claim) and sold such blanks at prices specified by the Lens Corporation, came within the patent monopoly and was therefore excluded from the operation of the Sherman Act. We are now speaking only about the license to the lens blank manufacturer issued by the Univis Corporation, which received the approval of this Court.

Should Univis today sue an unlicensed contributory infringer, this Court in following *Mercoid* v. *Minneapolis-Honeywell* would have to hold that Univis had misused its patent and was violating the anti-trust laws, because it was trying to protect itself and its licensee in the sale of lens blanks, which were not complete and which were less than the patented invention.

If Univis' conduct approved by this Court was excluded from the operation of the anti-trust laws because of the patent laws, then clearly Honeywell's conduct in licensing others to make less than the full patented structure, does not differ from that of Univis.

The difference, if any, is in the fact that Honeywell brought suit against an unlicensed contributory infringer after it had many licensees to sell less than the full claim of the invention, whereas Univis has not yet brought suit against an unlicensed manufacturer. Certainly the mere additional act of bringing suit to enjoin that which this Court said was a contributory infringement ought not change that which was not a violation of the anti-trust laws, into a violation of the anti-trust laws.

This inequitable rule results from the fact that in the decision, the Court did not give adequate consideration to the patent grant to which the "public faith" has been pledged for more than a hundred years.

We maintain that the patent system as embodied in the patent laws is just as much entitled to reasonable application of judicial rules as is the anti-trust system as embodied in the anti-trust laws.

When the facts bring a specific case within that borderland where men might differ as to whether the owner's conduct involves primarily a reasonable use of his patent grant on the one hand, or an unreasonable use, violating the anti-trust laws on the other hand, the Court should apply the rule which will fairly carry out two great systems of public policy as nearly as may be.

If the conduct primarily involves reasonable use of the grant, the "public faith" should protect the patent owner.

This the decision does not do.

We ask that the case be reheard, and the decision modified to eliminate the inequities in the rule, to which we have referred, and to clarify the law.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,

By BAIR & FREEMAN,
Its Attorneys.

W. P. BAIR,

.....

WILL FREEMAN,
GEORGE H. FISHER,
Of Counsel.

IN THE

Supreme Court of The United States

OCTOBER TERM, A. D. 1943.

THE MERCOID CORPORATION,
Petitioner,

vs.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Respondent.

Nos. 58, 59.

MOTION FOR ORDER TO STAY MANDATE.

COMES NOW, Minneapolis-Honeywell Regulator Company, the Respondent, and respectfully states to the Court that there is filed herewith a Petition for Rehearing. When the Mandate goes down, the parties must make substantial changes in business relations.

Respondent, therefore, moves for an Order Staying the Mandate until the Petition for Rehearing is ruled upon.

This Motion is made in good faith and not for purposes of delay.

Respectfully,

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,
Respondent.

By BAIR & FREEMAN,
Its Attorneys.

W. P. BAIR,

.....

WILL FREEMAN,
GEORGE H. FISHER,
Of Counsel.

January 25, 1944.

ACCEPTANCE OF SERVICE.

Service of the foregoing Petition, Brief and Motion, and receipt of copies thereof, acknowledged this ..... day of January, 1944.

.....

Attorney for Petitioner.

SUPREME COURT OF THE UNITED STATES.

Nos. 58 and 59.—October Term, 1943.

58	The Mercoid Corporation, Petitioner, *vs.* Minneapolis-Honeywell Regulator Company.	On Writs of Certiorari to the United States Circuit Court of Appeals for the Seventh Circuit.
59	The Mercoid Corporation, Petitioner, *vs.* Minneapolis-Honeywell Regulator Company.	

[January 3, 1944.]

Mr. Justice Douglas delivered the opinion of the Court.

These are companion cases to *Mercoid Corp.* v. *Mid-Continent Investment Co.*, Nos. 54 and 55, decided this day. One suit was instituted by petitioner, the other by respondent. Petitioner sought a declaratory judgment to the effect that the Freeman patent No. 1,813,732 was invalid and that petitioner did not infringe it, that respondent had used the Freeman patent in violation of the anti-trust laws, that respondent be restrained from threatening petitioner and its customers with infringement suits, that an accounting be had and treble damages awarded. Respondent in its bill sought a decree sustaining the validity of the Freeman patent and declaring that petitioner had infringed and contributed to the infringement of its claims. In the latter action petitioner filed a counterclaim praying for substantially the same relief as in its earlier bill. After issues were joined the causes were consolidated and tried together. The District Court said that the Freeman patent was valid and that Mercoid was guilty of contributory infringement. But it held that Minneapolis-Honeywell was using the patent as a means of controlling an unpatented device contrary to the rule of *Morton Salt Co.* v. *G. S. Suppiger Co.*, 314 U. S. 488. Accordingly, it dismissed both complaints. 43 F. Supp. 878. On appeal the Circuit Court of Appeals held that the patent claims in issue were valid and that Mercoid had infringed them. But it

disagreed with the District Court that respondent had sought to extend the scope of the patent in violation of the anti-trust laws. Accordingly, it reversed the judgment of the District Court, dismissing respondent's bill and affirmed it as respects the relief claimed by petitioner. 133 F. 2d 811.

The Freeman patent, as found below, covers a system of hot air furnace control which requires three thermostats for its operation. A room thermostat starts the stoker. Another thermostat (or limit switch) breaks the stoker circuit when the air in the furnace reaches a predetermined temperature, irrespective of the fact that the room thermostat may still call for heat. This second thermostat operates to prevent unsafe conditions due to overheating. The third thermostat is also in the furnace. It controls a fan which forces hot air from the furnace to the rooms. It does not permit the fan to start until the air in the furnace reaches a specified degree of heat. But at that point it starts the fan which continues to run, even though the limit switch has stopped the stoker, so long as the furnace is hot and the room thermostat calls for heat. The District Court found that the Freeman patent was a combination patent on a system of furnace control which requires those three thermostats for its operation and that it was not a patent on "either the fan switch or the limit switch or both of them." That finding was not disturbed by the Circuit Court of Appeals, which held that Freeman's "advance in the art" was the arrangement of thermostatic switches, subject to furnace heat to secure in connection with other parts the "sequence of operations" which we have described.

Minneapolis-Honeywell has licensed five of its manufacturing competitors under the Freeman patent. The licensees are granted a non-exclusive right under the patent to make, use and sell a "combination furnace control" which is defined as a thermostatic switch usable for a Freeman installation and designed in one unit to control the fan and limit circuits. Royalty payments to Minneapolis-Honeywell are based on the sales of the combination furnace controls, although the Circuit Court of Appeals found that the only Minneapolis-Honeywell control "which gets protection as a result of the licenses is the control usable only for a Freeman type of installation." Each licensee is required to insert in its catalogues or other sales literature and to attach to each combination furnace control sold a notice to the effect that the

control includes a license for one installation of the Freeman heating system. The licenses establish minimum prices for the sale of the controls; and those prices must not be cut by the licensees through the inclusion of "extras" or through the reduction of charges for services. Price lists are attached governing sales to manufacturers, jobbers, wholesalers, and dealers. Equal terms to all licensees are provided. Minneapolis-Honeywell tried on several occasions to induce Mercoid to take a license. Being unsuccessful it brought its present suit.

Neither the petitioner nor the respondent sells or installs the Freeman system in furnaces; that is to say, they do not practice the invention. They are competitors in supplying the switch to control the fan and limit circuits employed in such systems. That switch or combustion furnace control is unpatented[1] and respondent concedes that it is "less than the complete claimed invention." But, as we have said, the Circuit Court of Appeals took the view that that control provides "the sequence of operations which is the precise essence of Freeman's advance in the art". And the accused device has, according to the Circuit Court of Appeals, "no other use than for accomplishing the sequence of operations of the Freeman patent." The Circuit Court of Appeals concluded that although the combustion furnace control was unpatented, it served "to distinguish the invention" and to mark the "advance in the art" achieved by the Freeman patent. It accordingly held that the patent laws permit and the anti-trust laws do not forbid the control over the sale and use of the unpatented device which Minneapolis-Honeywell sought to achieve through its licensing agreements. We do not agree, even though we assume the patent to be valid.

The fact that an unpatented part of a combination patent may distinguish the invention does not draw to it the privileges of a patent. That may be done only in the manner provided by law. However worthy it may be, however essential to the patent, an unpatented part of a combination patent is no more entitled to monopolistic protection than any other unpatented device. For as we pointed out in *Mercoid* v. *Mid-Continent Investment Co.*, *supra*, a patent on a combination is a patent on the assembled

[1] There is some suggestion that this device is patented. But according to the District Court any such patent "is owned by some person other than Minneapolis-Honeywell and Mercoid, so that as to them and so far as this case is concerned, it is an unpatented device."

or functioning whole, not on the separate parts. The legality of any attempt to bring unpatented goods within the protection of the patent is measured by the anti-trust laws not by the patent law. For the reasons stated in *Mercoid* v. *Mid-Continent Investment Co., supra,* the effort here made to control competition in this unpatented device plainly violates the anti-trust laws, even apart from the price-fixing provisions of the license agreements. It follows that petitioner is entitled to be relieved against the consequences of those acts. It likewise follows that respondent may not obtain from a court of equity any decree which directly or indirectly helps it to subvert the public policy which underlies the grant of its patent. *Morton Salt Co.* v. *G. S. Suppiger Co.*, 314 U. S. 488, 494; *B. B. Chemical Co.* v. *Ellis*, 314 U. S. 495.

The judgment is reversed and the causes are remanded to the District Court for proceedings in conformity with this opinion.

Reversed.

Mr. Justice ROBERTS, Mr. Justice REED, Mr. Justice FRANKFURTER, and Mr. Justice JACKSON concur in the result on the authority of *Morton Salt Co.* v. *G. S. Suppiger Co.*, 314 U. S. 488.

A true copy.

Test:

Clerk, Supreme Court, U. S.